A TRANSLATION OF THE

QUAESTIO DE AQUA ET TERRA

BY

ALAIN CAMPBELL WHITE

NOTE

THIS paper was begun at the welcome suggestion of Professor Charles Eliot Norton, and its completion has only been made possible by his frequent advice, and constant and invaluable assistance, and by the kindness of Mr. William C. Lane, Librarian of Harvard University, in placing at my service books and pamphlets I could not have hoped to reach otherwise. I have also to acknowledge much useful criticism from the Judges of the Dante Society. In the Introduction and in my Notes I have availed myself extensively of the labors of Signor Giuliani, Mr. Paget Toynbee, and Dr. Edward Moore. Indeed, these notes could not have been made at all complete without the references in both volumes of Dr. Moore's Studies in Dante (First Series: *Scripture and Classical Authors in Dante;* Second Series: *The Genuineness of the "Quaestio de Aqua et Terra"*). I have followed, almost exactly, the Translations of Mr. Longfellow for the *Divine Comedy*, of Miss Hillard for the *Convito*, of Dr. Church for the *De Monarchia*, of Mr. Howells for the *De Vulgari Eloquio*, and of Mr. Latham for the *Letters*.

INTRODUCTION

In 1508, one hundred and eighty-seven years after the death of Dante, Giovanni Benedetto Moncetti da Castiglione Aretino — an Italian monk whose position and character have never been definitely settled — printed, in Venice, a small treatise, the *Quaestio de Aqua et Terra*, professing to be a scientific discussion held by Dante in Verona, on Jan. 30, 1320, concerning the relative levels of earth and water on the surface of the globe.

At the time of its publication no interest was taken in the subject-matter of the treatise. Dante himself was read but little, the Divine Comedy and the *Convito* being the only works of his accessible to the public. Consequently the *Quaestio* immediately sank into complete obscurity. We have no evidence that anybody besides Moncetti ever laid eyes on the manuscript from which it was supposed to have been printed; and the first edition became so rare that in 1843 Torri knew of only one copy. Up to the present time, however, five other copies have been found. These six are now respectively in the library of Marchese Trivulzio in Milan, the Marucellian library in Florence, the public library at Perugia, the University of Bologna, the British Museum, and Cornell University. So little was the treatise known that early writers mention it under various incorrect names — as *De Aqua et Igni* — their knowledge of it being evidently at second hand.

But with the publication of Dante's minor works in the course of the sixteenth century, interest in the *Quaestio* reawoke a little, and the year 1576, which saw the first edition of the *Vita Nuova*, also beheld a reprint of the treatise, by one Francesco Storella, a bookseller of Naples.

The authorship of the work was not called into serious question for over three hundred years; but since the beginning of the last century there has been a tendency to consider it spurious, a mere exercise, or, in cruder language, a forgery of Moncetti. In Italy and Germany

opinion has been especially hostile to its authenticity, although the point is one by no means easily settled.

Once definitely proved a forgery, the *Quaestio* would, of course, lose every claim to the attention of the student; but once proved genuine, its value as an interesting commentary on many cosmographical passages in the Divine Comedy would be considerable, as is shown in Professor Wilhelm Schmidt's excellent article, "*Über Dante's Stellung in der Geschichte der Kosmographie*" (Graz, 1856).

In this Essay, Professor Schmidt, who accepts the genuineness of the *Quaestio*, argues that it is just such a treatise as Dante could and would have written; every important idea is to be found in the author's other works, and the form and expression are completely in his style. Further than this, the proof of the genuineness of a work concerning which no definite external evidence exists cannot go; and the object of the following pages will be to show as fully as possible the truth of Professor Schmidt's opinion, by first explaining that what little external evidence there is, is not adverse to the genuineness of the *Quaestio*, and then by throwing on the text what light thereon has been drawn from the works of Dante and of his predecessors. I shall endeavor to show by the references in my notes that the author of the *Quaestio* had a remarkable knowledge of Dante's writings, that he exhibits marked sympathy with his later ideas, that he treats similar thoughts with entire similarity of manner, and finally that he bases all his arguments on those very authorities whom Dante knew and studied. Some of these authorities, it is important to notice, were very little read two centuries later. Dr. Moore (*Dante Studies* ii., 358, *Dante and Ristoro d'Arezzo*), indeed, has proved almost conclusively that Moncetti, for instance, could never have read Ristoro d'Arezzo, who is evidently referred to in the *Quaestio*.

If we consider the list of opinions in respect to its genuineness cited by Lodrini, who contests it (*Commentari dell' Ateneo di Brescia*, 1890, pp. 55, 75–6), we are struck by the large number of critics favoring the authenticity of the *Quaestio*, — there being eighteen for it, four against, and five non-committal. The advocates of its genuineness date from Storella, the editor of the second edition, 1576; whereas the sceptics do not appear for almost two centuries, the first being Pelli, 1758; the real opponents not finding a voice until Foscolo, 1825. This list is not of great value, however, for it not only contains the names of various writers who have only touched on the work in the most cursory manner,

and can consequently hardly be ranked as critics of it, but it actually places among the supporters of the work's genuineness the dogmatic Scartazzini, who is really one of its strongest denouncers. Whatever may be the reason that Lodrini mustered up this large array of champions, he himself does but little to overthrow them, using as his main argument the assertion that any good Dante scholar could easily have forged the *Quaestio*, and assuming that the worthy Father Moncetti, monk and mathematician, was thus capable.

As to Father Moncetti's mental capacity, diversity of opinion exists. Dr. Prompt (*Œuvres Latines du Dante*, Paris, 1888), who takes the negative side of the debate, clamorously proclaims his complete imbecility, dubbing him "homme ignorant et stupide, incapable de faire un calcul exact, du moment que ce calcul offrait une légère difficulté," and so — the wherefore is perhaps not wholly obvious — just the man to be our forger. Messrs. Luzio and Rénier (*Giornale Storico*, Vol. XX, pp. 125–150, *Il Probabile Falsatore della Quaestio*) paint what is most likely a more accurate portrait of the "probable forger of the *Quaestio*." In their hands Moncetti appears as a clever mathematician, crammed with much physical lore, bombastic withal and self-assertive, fond of linking his own name to those of the great in station and in brains, the editor incidentally of a perfectly genuine, but new-found, Treatise, by Egidio Colonna (a Cardinal in Dante's day), which he dedicates to Henry VIII. of England. The picture is interesting, but does not necessarily incline us to see in Moncetti the author of the moderate, sober *Quaestio*, in which surely there are no anachronisms, no bombast, no "shallow vehemence" (such as would be almost inevitable in the composition of a sixteenth-century student), while at the same time it displays on the part of the author, whoever he may have been, a profound knowledge of and sympathy with, Dante's works, both those extant in print and those not yet thus extant in 1508, — a knowledge which Moncetti gave no other hint of possessing, a sympathy he never again exhibited. It is an out-of-date discussion, barren of all interest to the century of the Renaissance, while close at hand lay tempting bait for a skilful forger, — endless classic models, and those offered by Dante himself in the unwritten books of the *Convito* or the *De Vulgari Eloquio*, — inviting composition.

Here is, in fact, a remarkable monument of mediæval study; and these modern critics would have us believe it the forgery of a monk of

the cinquecento, who apparently had not the patience even to complete the "diligent and accurate correction" he boasts of undertaking! Was not this rather the sort of "correction, revision, renewal, and argumentation" that he administered seven years later to the avowedly genuine filth and absurdities of the famous Cardinal, so as not to appear his mere transcriber? Or again, we may ask, if Moncetti thus diligently corrected the proof-sheets of his own forgery, so that many portions of the first edition are incomprehensible, how could he have resisted the temptation of correcting these wilful errors of his in erudite foot-notes?

Scartazzini's arguments against the genuineness have more violence, if but little more force. Out of four pages of invective, I venture to quote two typical extracts:[1] —

"We are here in presence of a miracle. Dante must have known the theory developed two hundred years later by Leonardo da Vinci, or must at least have had a clear presentiment of it. He must have been in possession of discoveries which future generations were the first to make. Stoppani[2] has discovered that the little work contains nine truths of cosmology hitherto undreamt of which were in part foreseen, in part distinctly asserted, and in part proved, and which form the bases of modern science, namely, (1) the moon is the main cause of ebb and flow, (2) equality of the level of the sea, (3) centripetal force, (4) spherical form of the earth, (5) that the dry land is merely excrescences from the earth's surface, (6) the grouping of continents towards the north, (7) universal attraction, (8) the elasticity of steam as a motive power, (9) upheaval of the continents. Dante must indeed have been a wonderful man!" How much more wonderful the perspicuity of Stoppani and the easy credulity of Scartazzini!

"If Dante delivered that treatise before all the learned world of Verona, it is obvious that its contents must have aroused very considerable notice, and yet not a word was said about it. No single chronicler, no single member of the audience, no single contemporary writer has, so far as we know, taken the very slightest notice of these new facts of cosmology. No word, no sound was uttered against it in spite of the many opponents who are spoken of in the treatise. No report,

[1] Scartazzini: *Companion to Dante.* (*Butler's Translation,* pp. 367–9.)

[2] See Stoppani's Letter to Giuliani in the latter's *Opere Latine di Dante.* ii. pp. 451–63.

direct or indirect, has been preserved of a fact of such importance which took place in the presence of the whole city of Verona, and it would have remained forever forgotten had not the good Father Moncetti, two hundred years later, produced and made known the treatise which, according to him, had rested for many olympiads in the bookcase."

These remarks have been more than answered by Dr. Moore. His comments on Stoppani's "marvellous anticipations" I have followed as these arise, or seem to arise, in the text. If so-called anticipations and prophecies were proof of a work's lack of authenticity, what would become of the Inferno and the Purgatorio, in whose verses have been discovered the theories and doctrines of Harvey, Luther, and even Swedenborg?

Finally, as regards the points raised in the second paragraph of the preceding citation I cannot do better than quote Dr. Moore's own words:

"It is true that no ancient biographer or commentator mentions or alludes to this work. But, assuming the account given on the face of it to be true, the discussion was held only about eighteen months before Dante's death, and there is no reason to suppose that it was ever put forth or published by him (whatever publication may have meant in those days). Probably, like a Paper read before a Society, or the MS. of a Lecture, the document was afterwards thrown aside and forgotten or mislaid, until (according to the account given) it was accidentally unearthed two centuries later. Such things have often happened in other cases, and in respect of works of much greater importance and general interest than this. It must be remembered also that the subject was highly technical, and one that would appeal to a very limited and special class of readers or hearers. We need not be surprised if the learned author was not 'requested to publish his interesting discourse,' and if no one took the trouble to copy it (even if any one had the chance), or if it never came to the knowledge of any early writer about Dante, none of their works (be it noted) falling within forty years or so of his death."[1]

The text of the *Quaestio* is not an easy one for the translator to deal with. Even admitting the genuineness of the treatise, the text is in many places evidently corrupt. Its first editor did not follow the

[1] Moore: *Studies in Dante. Second Series.* p. 308.

manuscript exactly, as appears from the words on his title-page: *diligenter et accurate correcta*; while subsequent editors — notably Torri — have made yet further changes, not always emendations. Besides the state of the text, the scholastic method of expression is a constant obstacle to fluent translation: it is frequently confused, and involves the use of terms hard to render, and of trains of reasoning that in several cases cannot but seem false to us.

In following the text of the Oxford Dante, I have changed two readings, which were almost certainly not the author's, and, with the approval of Professor Norton, I have moved the position of two commas, where the sense was improved by the change. I have further ventured to omit the paragraph headings, as they are of the most doubtful authenticity and frequently unsatisfactory and misleading. I have substituted an analysis of the treatise, by reference to which the argument can be a little more readily followed.

ANALYSIS OF THE TREATISE

---

§ I. *Introduction:* Author's reasons for undertaking the discussion.

§ II. *The Question:* Is Water, or the surface of the sea, anywhere higher than the Earth, or habitable dry land?

Five affirmative arguments generally accepted.

§ III. *Reason 1.* Geometrical Proof: Earth and Water are spheres with different centers; the center of the Earth's sphere is the center of the universe: consequently the surface of the Water is above that of the Earth.

§ IV. *Reason 2.* Ethical Proof: Water is a nobler element than Earth: hence it deserves a nobler, or higher, place in the scheme of the universe.

§ V. *Reason 3.* Experimental Proof: based on sailors seeing the land disappear under their horizon when at sea.

§ VI. *Reason 4.* Economical Proof: The supply of Water, namely the sea, must be higher than the Earth: otherwise, as Water flows downwards, it could not reach, as it does, the fountains, lakes, etc.

§ VII. *Reason 5.* Astronomical Proof: Since Water follows the moon's course, its sphere must be excentric, like the moon's excentric orbit; and consequently in places be higher than the sphere of Earth.

§ VIII. These Reasons unfounded.

i. *Refutation by observation.* Water flows down to the sea from the land; hence the sea cannot be higher than the land. Cf. § VI.

ii. *Refutation by reasoning.*

§ IX. Order of Refutation.

I. Proof that Water cannot be higher than the dry land. §§ X–XIII.

II. Demonstration that land is higher than the sea. §§ XIV–XV.

III. Possible objections, and refutation thereof. §§ XVI–XIX.

IV. Causes of the elevation of the dry land. §§ XX–XXII.

a. Final cause.

b. Efficient cause.

V. Refutation of arguments in §§ III–VII. § XXIII.

§ X. I. Water could only be higher than the Earth:
1. If it were excentric, or
2. If it were concentric, but had some excrescence.

§ XI. but since:
A. Water naturally moves downwards, and
B. Water is naturally a fluid body:

§ XII. 1. cannot be true, for three impossibilities would follow:
a. Water would move upwards as well as downwards;
b. Water and Earth would move downwards in different directions;
c. Gravity would be taught ambiguously of the two bodies.

Proof of these impossibilities by a diagram.

§ XIII. 2. cannot be true, for
a. The Water of the excrescence would be diffused, and consequently the excrescence could not exist;
b. It is unnecessary, and what is unnecessary is contrary to the will of God and Nature.

§ XIV. II. It has been shown that Water is of one level, and concentric with the Earth:

§ XV. Therefore, since the shores are higher than the edges of the sea, and since the shores are the lowest portions of the land,
It follows that all the land is higher than the sea.

§ XVI. III. *Possible argument:* Earth is the heaviest body; hence it is drawn down to its own center, and lies beneath the lighter body, Water.

§ XVII. *Objection to this argument:* Earth is the heaviest body only by comparison with others; for Earth is itself of different weights.

§ XVIII. *Refutation of this objection:* On the contrary, Earth is a simple body, and as such subject to be drawn equally in every part.
Conclusion: Since the objection is in itself sound, and Earth by its own Particular Nature, due to the stubbornness of matter, would be lower than the sea; and since Universal Nature requires that the Earth project somewhere, in order that its object, the mixture of the elements, may be fulfilled:
It follows that there must be some final and efficient cause, whereby this projection may be accomplished.

§ XIX. The form of this emerging continent has been studied, and it is that of a half-moon, extending 180 degrees longitudinally from Cadiz to the River Ganges, and 67 degrees latitudinally from the Equator to the neighborhood of the Arctic Circle.

§ XX. IV. The causes of the elevation of the land.

a. The final cause has been seen to be the purpose of Universal Nature.

b. The efficient cause cannot be (i) the Earth, (ii) the Water, (iii) the Air or Fire, (iv) the heaven of the Moon, (v) the Planets, nor (vi) the Primum Mobile:

Therefore it must be ascribed to the heaven of the Fixed Stars (for this has variety in efficiency, as is seen in the various constellations), and in particular to those Stars of the Northern Hemisphere which overhang the dry land.

First objection: Why is the projecting continent then, not circular, since the motion of these stars is circular?

Answer: Because the material did not suffice for so great an elevation.

Second objection: Why is this elevation in this particular place?

Answer: Because God, whose ways are inscrutable, willed it so.

§ XXII. We should therefore desist from examining too closely the reasons, which we can never hope to fathom.

§ XXIII. V. *Refutation of the original arguments:*

Reason 1. Invalid because Earth and Water are spheres with the same center.

Reason 2. Invalid because of the external influence of Universal Nature, counteracting the internal influence of Particular Nature.

Reason 3. Invalid because it is the sphericity of the sea and not the lowness of the land which interferes with one's view at sea.

Reason 4. Invalid because Water does not flow to the tops of mountains, but ascends thither in the form of vapors.

Reason 5. Invalid because Water imitating the moon in one respect, need not imitate it in all.

§ XXIV. (*Conclusion:* Date and place of the discussion.)

QUAESTIO

DE AQUA ET TERRA

Universis et singulis praesentes litteras inspecturis, Dantes Aligherius[1] de Florentia, inter vere philosophantes[4] minimus,[3] in Eo salutem, qui est principium veritatis et lumen.

§ I. Manifestum sit omnibus vobis quod, existente me Mantuae, quaestio quaedam exorta est, quae dilatata multoties ad apparentiam magis quam ad veritatem,[6] indeterminata restabat. Unde quum in amore veritatis a pueritia mea continue sim nutritus, non sustinui quaestionem praefatam linquere indiscussam: sed placuit de ipsa

[1] *Purg.* XXX. 62–3. "... Mi volsi al suon del nome mio,
Che di necessità qui si registra."

[3] *Epist.* VIII. 70–2. "Quippe de ovibus pascuis Iesu Christi minima una sum."

[4] *Conv.* I. i. 67–8. "Io . . . che non seggo alla beata mensa."

[6] *Conv.* III. Canz. ii. 82–3. "Non considera lei secondo 'l vero,
Ma pur secondo quel che a lei parea."

Dante Alighieri[1] of Florence,[2] least[3] among real philosophers,[4] to each and every reader of these words, greeting in His name, who is the source and beacon of truth.[5]

§ I. Let it be known to you all that, whilst I was in Mantua, a certain Question arose, which, often argued according to appearance rather than to truth,[6] remained undetermined. Wherefore, since from boyhood I have ever been nurtured in love of truth,[7] I could not bear to leave the Question I have spoken of undiscussed: rather I wished to demonstrate the truth concerning it, and likewise, hating untruth as

[1] In its Latin form Dante's surname (variously spelled by various editors) occurs only here, in § XXIV, and in some of the Letters.

For Dante's dislike to the use of his name: *Purg.* XXX. 62–3.

"... At the sound I turned of my own name,
Which of necessity is here recorded."

[2] *Florentia:* so spelled by Dante nine times in his other works.

[3] *Epist.* VIII. 70–2. "In truth I am one of the least among the sheep in the flock of Jesus Christ."

[4] Those who dwell with E. Lodrini (*Commentari dell' Ateneo di Brescia,* 1890, pp. 61–3) on Dante's frequent contempt for contemporary philosophy, and hence do not think him capable of condescending to the present expression, should understand that by the "real philosophers" referred to here, "contemporary philosophers" are not intended.

Conv. I. i. 67–8. "And I . . . who do not sit at the blessed table."

[5] Dr. Moore does not insist on the genuineness of this introduction and of the colophon. If, as Moncetti boasts, the Treatise was "diligenter et accurate correcta" by himself, these are the parts he would most likely have retouched. They are, however, no more out of place than similar paragraphs in the Letters; this is particularly the case with the concluding words of the Treatise, which are fairly Dantesque in expression.

[6] *Conv.* III. Canz. ii. 82–3. "Do not consider what she says as truth,
But only such as seemeth truth to her."

[7] See Aristotle: *Nic. Eth.* I. vi. 1. Quoted by Dante four times elsewhere, viz.: *De Mon.* III. i. 17–8; *Conv.* III. xiv. 79 ff.; IV. viii. 142; and *Epist.* VIII. 84 (see Moore, II. 329). Cf. also *Nic. Eth.* I. iv. referred to in Letter IX. (Latham, p. 167).

verum ostendere, nec non argumenta facta contra dissolvere,[2] tum veritatis[1] amore tum etiam odio falsitatis. Et ne livor multorum qui absentibus viris invidiosis[3] mendacia confingere solent, post tergum benedicta transmutent,[4] placuit insuper in hac cedula meis digitis[5] exarata, quod determinatum fuit a me relinquere, et formam totius disputationis calamo designare.

§ II. Quaestio igitur fuit de situ et figura, sive forma duorum elementorum, *Aquae* videlicet et *Terrae;* et voco hic *formam* illam, quam Philosophus ponit in quarta specie qualitatis in *Praedicamentis*.[7] Et restricta fuit quaestio ad hoc, tamquam ad principium investigandae

[1] *Conv.* IV. i. 18–24. "Onde io fatto amico di questa Donna . . ., cominciai ad amare e a odiare secondo l' amore e l' odio suo. Cominciai dunque ad amare li seguitatori della verità, e odiare li seguitatori dello errore e della falsità, com' ella face."

Par. XVII. 118–9. "E s' io al vero son timido amico,
Temo," etc.

Par. XXVIII. 108. "Nel vero in che si queta ogn' intelletto."

[2] *Conv.* IV. ii. 134–41. "Nel Trattato prima si riprova lo falso, acciocchè, fugate le male opinioni, la verità poi più liberamente sia ricevuta. E questo modo tenne il Maestro della umana ragione, Aristotile, che sempre prima combattéo cogli avversari della verità, e poi, quelli convinti, la verità mostrò."

[3] *Par.* X. 138. "Invidiosi veri."
Inf. III. 48. "Che invidiosi son d' ogni altra sorte."

[4] *Conv.* I. iv. 49–50, 53–5. "Quando questi cotali veggiono la persona famosa, incontanente sono invidi . . . E questi non solamente passionati mal giudicano, ma, diffamando, agli altri fanno mal giudicare."

[5] "Manu propria scripta a Dante Florentino Poeta clarissimo."

[7] *De Mon.* III. xv. 58–9. "Ut doctrina Praedicamentorum nos docet."

well as loving truth,[1] to refute contrary arguments.[2] And lest the spleen of many, who, when the objects of their envy[3] are absent, are wont to fabricate lies, should behind my back transform well-spoken words,[4] I further wished in these pages traced by my own fingers[5] to set down the conclusion I had reached and to sketch out, with my pen, the form of the whole controversy.

§ II. The Question then concerned the location and the shape, or form, of two of the elements, Water namely and Earth; and here I call "form" that which the Philosopher[6] in the Categories[7] ranks as the fourth species of Quality. And the Question was confined to this — as the very foundation of the truth to be investigated — that the inquiry

[1] *Conv.* IV. i. 18–24. "Whence I, having become the friend of this lady, . . . began to love and to hate according to her love and hatred. Therefore I began to love the followers of the truth, and to hate the followers of error and falsehood as she does."

Par. XVII. 118. "And if I am a timid friend to truth,
I fear," etc.

Par. XXVIII. 108. "The Truth, in which all intellect finds rest."

[2] *Conv.* IV. ii. 134-41. "In the treatise we first refute the false, in order that, false opinions being dispelled, the truth may be more liberally received. And this method was used by the master of human reason, Aristotle, who always in the first place combated the adversaries of truth, and then, these conquered, demonstrated that truth."

[3] *Par.* X. 138. "Invidious verities."

The usual meaning occurs *Inf.* III. 48. "They envious are of every other fate."

[4] *Conv.* I. iv. 49–50, 53–5. "When such people see a famous person, they immediately become envious . . . and thus they not only misjudge, being swayed by passion, but their calumnies cause others to misjudge."

[5] Moncetti says, in the first edition — 1508 — that the treatise was "written by the very hand of the far-famed poet, Dante the Florentine."

[6] Aristotle so called 39 times elsewhere in the Latin works (including the Letters and the *Quaestio*), and "*Il Filosofo*" upward of 40 times in the *Vita Nuova* and the *Convito.*

[7] *De Mon.* III. xv. 58–9. "As we learn from the doctrine of the Categories." Arist. *Categories*, viii. (10*a*. 11).

Dante elsewhere shows knowledge of, if not familiarity with, the two logical works of Aristotle quoted in the *Quaestio* (*Categ.* and *Prior Anal.*). Dr. Moore (ii. 351) remarks, "The formal logical treatment of the present subject would make such references probable and natural."

veritatis, ut quaereretur:[1] Utrum aqua in spherae sua, hoc est in sua naturali circumferentia, in aliqua parte esset altior terra quae emergit ab aquis,[2] et quam communiter quartam habitabilem[3] appellamus; et arguebatur quod sic[4] multis rationibus, quarum (quibusdam amissis propter earum levitatem) quinque retinui, quae aliquam efficaciam habere videbantur.

§ III. Prima fuit talis: Duarum circumferentiarum inaequaliter a se distantium impossibile est idem esse centrum: circumferentia aquae et circumferentia terrae[6] inaequaliter distant; ergo etc. Deinde pro-

[1] *Il Libro di Sidrach.* ch. ccxxxvii: "Lo re domanda: quale è più alto o la terra o lo mare? Sidrac risponde: 'La terra è assai più alta che 'l mare.'"

[2] Rist. d'Arezzo. *Comp. del Mundo.* I. 20. "E noi troviamo una parte della terra scoperta dall' acqua; e secondo i savi è la quarta parte scoperta."

[3] Rist. d'Arezzo. *Comp. del Mundo.* VI. 2. "La chiamarono 'quarta abitabile.'"

[4] Brunetto. *Trésor.* I. iii. c. 106. "La mers est plus haute que la terre."

S. Thomas Aquinas. *Summa.* i. 69, i. § 2. "Nam mare est altius terra, ut experimento compertum est in mari rubro."

Rist. d'Arezzo. *Comp. del Mundo.* VI. 7. "Secondo questa via sarà più alta l' acqua della terra."

[6] Alfraganus. *Elem. Astron.* iii. init. "Haud secus inter sapientes convenit, terram uno cum aqua globosam esse."

should be[1]: whether water in its own sphere, that is in its natural circumference, is anywhere higher than the earth which emerges from the waters[2] and which we commonly call the "habitable quarter:"[3] and this was argued to be so[4] for many reasons, of which, discarding some for their shallowness, I have retained five which appeared to have some weight.

§ III. The first was as follows: It is impossible for two circumferences not equidistant from one another to have the same center;[5] the circumference of the water and the circumference of the earth[6] are not

[1] *Il Libro di Sidrach* (quoted by Dr. Moore, II. 370): "The king asks: which is higher, the earth or the sea? Sidrac answers: 'the earth is considerably higher than the sea.'"

[2] Ristoro d'Arezzo. I. 20. "And we find part of the earth not covered by the waters, and philosophers say a fourth part is thus uncovered."

[3] Ristoro d'Arezzo. VI. 2. "They called it the 'habitable quarter.'"

[4] Almost every one held this view.

Brunetto Latini. I. iii. c. 106. "The sea is higher than the land."

S. Thomas Aquinas. *S.* i. 69. i. § 2. "For the sea is higher than the land, as has been found by experiment in the Red Sea."

Ristoro d'Arezzo. VI. 7. "According to this, water will be higher than the earth."

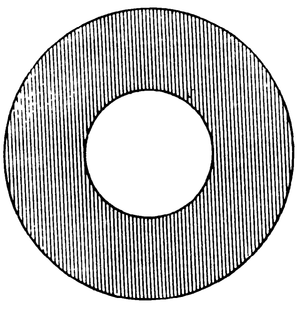


FIG. 1.

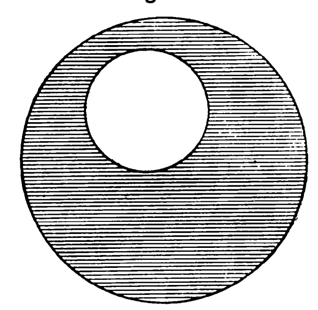


FIG. 2.

[5] By "circumference" is here meant the surface of a sphere. In Fig. 1, the shell between the two spherical surfaces is equally thick, and the two surfaces have the same center. Fig. 2 is the case discussed in the text: if the shell included between the two spherical surfaces is not everywhere equally thick, the two surfaces cannot have the same center.

[6] The sphericity of the earth is the fourth Anticipation of Stoppani. The idea, however, is far older than Dante. Besides many of the Greek philosophers who held it, as Aristotle, *De Coelo.* II. xiv., Dr. Moore (II. 323) quotes Alfraganus, *Elem. Ast.* iii.: "Philosophers agree that the earth and water together form a globe."

cedebatur: Quum centrum terrae sit centrum universi,[1] ut ab omnibus confirmatur; et omne quod habet positionem in mundo aliam ab eo, sit altius;[2] quod circumferentia aquae sit altior circumferentia terrae concludebatur, quum circumferentia sequatur undique ipsum centrum. Maior principalis syllogismi videbatur patere per ea, quae demonstrata sunt in geometria; minor per sensus, eo quod videmus in aliqua parte terrae circumferentiam includi a circumferentia aquae, in aliqua vero excludi.

§ IV. Nobilior corpori debetur nobilior locus;[3] aqua est nobilius corpus quam terra: ergo aquae debetur nobilior locus.[4] Et cum locus tanto sit nobilior quanto superior, propter magis propinquare nobilissimo continenti,[5] qui est coelum primum; ergo etc. Relinquo, quod locus aquae sit altior loco terrae, et per consequens quod aqua sit altior terra, quum situs loci et locati non differat. Maior et minor principalis syllogismi huius rationis quasi manifeste[7] dimittebantur.

[1] *Conv.* III. v. 61–5. "Assai basta alla gente, a cui parlo, per la sua grande autorità sapere, che questa terra è fissa e non si gira, e che essa col mare è centro del cielo."

[2] Ristoro d'Arezzo. *Comp. del Mundo.* I. 20. "Da qualunque part noi ne movemo da questo punto andiamo verso il cielo e alla insù."

Sacrabosco. *De Sphaera.* I. 8. "Quidquid a medio movetur versus circumferentiam coeli ascendit."

[3] Aristotle. *De Coelo.* II. xiii. "*τῷ γὰρ τιμιωτάτῳ οἴονται προσήκειν τὴν τιμιωτάτην ὑπάρκειν χώραν.*"

[4] *Conv.* III. v. 37–9. "Dicea che 'l fuoco era nel mezzo di queste, ponendo quello essere più nobile corpo che l' acqua e che la terra."

[5] *Epist.* X. 461–3. "Sed in naturali situ totius universi primum coelum est omnia continens."

Par. II. 112–4. "Dentro dal ciel della divina pace
Si gira un corpo, nella cui virtute
L' esser di tutto suo contento giace."

Conv. II. iv. 35–6. "Questo è il sovrano edificio del mondo, nel quale tutto il mondo s' inchiude."

[7] Boehmer suggests reading *manifestae.*

equidistant; therefore, etc. Then the argument proceeded: since the center of the earth is the center of the Universe [1] as everybody acknowledges; and since everything that has its place in the world other than there, is above it;[2] it follows that the circumference of the water is above the circumference of the earth, inasmuch as a circumference everywhere follows its own center. The major premise of the principal syllogism seemed evident from the demonstrations of geometry; the minor from the fact that we see the circumference of the earth in some part to be within, in another indeed to be outside of, the circumference of water.

§ IV. The nobler body deserves the nobler place:[3] water is a nobler body than earth; hence water deserves the nobler place.[4] And as a region is nobler the higher it is, because it draws nearer the noblest all-enfolding,[5] which is the first heaven; therefore, etc. I admit, that the region of water is higher than the region of earth,[6] and that consequently water is higher than earth, since the location of a region and of whatever occupies that region do not differ. The major and minor premises of the principal syllogism of this reason were dismissed as virtually self-evident.

[1] *Conv.* III. v. 61–5. "It is quite enough for those to whom I speak, to know on his (Aristotle's) great authority that this earth is immovable, and does not revolve, and that, with the sea, it is the center of the heavens."

[2] Ristoro d'Arezzo. I. 20. "However we move from this point, we go towards heaven, and to that which is above."

Sacrabosco. I. 8. "Whatever moves from the center towards the circumference of heaven ascends."

[3] Arist. *De Coelo.* II. xiii. (293 *a.* 30). "They deem it fitting for the nobler place to belong to the nobler body."

[4] *Conv.* III. v. 37–9. "He said that fire was between these two [stars], asserting that it was a more noble element than water and earth."

[5] *Epist.* X. 461–3. "But in the natural relation of the whole universe, the first heaven containeth all things."

Par. II. 112–4. "Within the heaven of the divine repose
Revolves a body, in whose virtue lies
The being of whatever it contains."

Conv. II. iv. 35–6. "This is the supreme edifice of the universe, in which all the world is included."

[6] This refers to the theory generally held in the Middle Ages that a sphere of water surrounded the sphere of earth.

§ V. Tertia ratio erat: Omnis opinio quae contradicit sensui, est mala opinio; opinari aquam non esse altiorem terra, est contradicere sensui: ergo est mala opinio. Prima dicebatur patere per commentatorem[1] super tertio *de Anima:* secunda, sive minor, per experientiam nautarum, qui vident, in mari existentes, montes sub se; et probant dicendo, quod ascendendo malum vident eos, in navi vero non vident; quod videtur accidere propter hoc, quod terra valde inferior sit et depressa a dorso[2] maris.

§ VI. Quarto arguebatur sic: Si terra non esset inferior ipsa aqua, terra esset totaliter sine aquis, saltem in parte detecta,[3] de qua quaeritur; et sic essent nec fontes, neque flumina, neque lacus;[4] cuius oppositum videmus: quare oppositum eius ex quo sequebatur, est verum,[5] quod aqua sit altior terra. Consequentia probabatur per hoc, quod aqua naturaliter fertur deorsum: et cum mare sit principium omnium aqua-

1 *Conv.* IV. xiii. 67–9. "Chi intende il Commentatore nel terzo *dell' Anima.*"

De Mon. I. iii. 77–8. "Averrois, in Commento super iis quae de Anima."

Inf. IV. 144. "Averrois, che il gran comento feo."
Purg. XXV. 63. "Più savio di te."

2 *Conv.* III. v. 83 and 94. "In su quel dosso del mare."

3 *Conv.* III. v. 73. "Terra discoperta."

4 *Li Livres dou Trésor.* i. 106. "La terre est toute pertuisie dedans et pleine de vaines et de cavernes, par quoi les aigues qui de la mers issent vont et viennent parmi la terre et dedanz et dehors sourdent, selonc ce que les vaines les mainent ça et là."

5 *De Mon.* II. xii. 26–8. "Consequens est falsum, ergo contradictorium antecedentis est verum."

De Mon. II. xiii. 5–5. "Hoc autem est falsum; ergo contradictorium eius ex quo sequitur est verum."

§ V. The third reason was: Every hypothesis that contradicts the senses is a wrong hypothesis; to suppose that water is not higher than earth is to contradict the senses; hence it is a wrong hypothesis. The first premise was said to be evident from the Commentator [1] on the third "Of the Soul;" the second, or minor, by the experience of sailors who when at sea behold mountains beneath them, and to prove this say that climbing the mast they see them, whereas indeed from their decks they do not see them; which seems to be because the earth is really lower than, and sunk beneath, the crest [2] of the sea.

§ VI. The fourth argument was this. If the earth were not lower than the water, the earth would be completely without water, at least in the uncovered [3] regions with which the Question is concerned; and so there would be neither fountains, nor streams, nor lakes; [4] now we see the opposite of this to be the case; therefore that on which this opposite depends is true [5] — namely, that the water is higher than the earth. This conclusion was confirmed by the fact, that water naturally flows downward; and since the sea is the source of all waters

[1] *Conv.* IV. xiii. 67–9. "He who understands the Commentator, in the third *Of the Soul.*"

De Mon. I. iii. 77–8. "Averroes, in his comment on [Aristotle's] treatise on the Soul."

Inf. IV. 144. "Averroes, who the great Comment made."

Purg. XXV. 63. "A wiser man than thou."

These quotations show Dante to have been familiar with Averroes' Commentary on Aristotle, although here—as in all of Dante's references to Averroes — the passage is difficult to locate.

[2] *Conv.* III. v. 83 and 94. "Above this crest of the ocean."

[3] *Conv.* III. v. 73. "The discovered earth."

[4] Brunetto Latini. i. 106. "The earth is all honeycombed inside and full of arteries and caverns, whereby the waters that issue from the sea go and come through the earth and surge within and without, according as the arteries lead them hither and thither."

[5] *De Mon.* II. xii. 26–8. "But the consequent is false: therefore the contradictory of the antecedent is true."

De Mon. II. xiii. 3–5. "This is false, therefore its contradictory is true."

rum (ut patet[1] per Philosophum in *Meteoris*[2] suis), si mare non esset altius quam terra, non moveretur aqua ad ipsam terram; quum in omni motu naturali aquae principium oporteat esse altius.

§ VII. Item arguebatur quinto: Aqua videtur maxime sequi motum Lunae,[3] ut patet in accessu et recessu maris; cum igitur orbis Lunae sit excentricus, rationale videtur quod aqua in sua sphaera excentricitatem imitetur orbis Lunae, et per consequens sit excentrica: et quum hoc esse non possit, nisi sit altior terra, ut in prima ratione ostensum est; sequitur item quod prius.

§ VIII. His igitur rationibus, et aliis non curandis, conantur ostendere suam opinionem esse veram, qui tenent aquam esse altiorem terra ista detecta, sive habitabili, licet in contrarium est sensus et ratio. Ad sensum enim videmus, per totam terram flumina descendere ad mare tam meridionale quam septentrionale, tam orientale quam occidentale; quod non esset, si principia fluminum et tractus alveorum non essent altiora ipsa superficie maris. Ad rationem vero patebit inferius; et hoc multis rationis demonstrabitur in ostendendo sive determinando de situ et forma duorum elementorum, ut superius tangebatur.

[1] *De Mon.* III. vii. 19. "Ut patet ex iis. . . ."
Epist. X. 614. "Ut patet per Iohannem ibi."

[2] Arist. *Meteor.* II. ii. "τελευτὴ μᾶλλον ὕδατος ἢ ἀρχή."

[3] *Par.* XVI. 82–3. "E come il volger del ciel della luna
Copre e discopre i liti senza posa."

Lucan. *Pharsalia.* X. 204. "Luna suis vicibus Tethyn terrenaque miscet."

Pliny. II. 97. (quoted by Vincent de Beauvais (V. 18) and by Dr. Moore (II. 320)): "Aestus maris accedere et reciprocare mirum est, verum causa est in sole et luna."

S. Thomas Aquinas. *Summa.* I. Q. 110. Art. 3. "Sicut fluxus, et refluxus maris non consequitur formam substantialem aquae, sed virtutem lunae."

(as is made clear[1] by the Philosopher in his Meteorics[2]) if the sea were not higher than the earth, the water would not flow to the earth — for in every natural movement of water the source must be the higher.

§ VII. Further it was argued fifthly: Water seems in the main to follow the course of the moon,[3] as is seen in the ebb and flow of the sea; therefore since the orbit of the moon is excentric it seems reasonable that water in its sphere should imitate the excentricity of the moon's orbit, and consequently be excentric: and — since this could not be unless it were higher than the earth as was shown in the first reason — the same follows as before.

§ VIII. For these reasons, then, and for others of no account, those who hold that water is higher than the uncovered or habitable land endeavor to show the truth of their opinion, although observation and reason are against it. For as to observation, we see throughout the earth rivers flowing down to the sea, in the south and in the north, in the east and in the west, which would not occur if the sources of the streams and the course of their channels were not higher than the surface of the sea. As to reason, indeed, we shall see further on; and the truth will be demonstrated by many reasons in showing, or rather determining, the location and form of the two elements, which was touched on above.

[1] *De Mon.* III. vii. 19. "As is plain from."

Epist. X. 614. "As doth appear in St. John where he saith."

[2] Arist. *Meteorics.* II. ii. (356 *a.* 33, *b.* 1). Aristotle, as Dr. Moore points out (I. 336), maintains that the sea "is the destination rather than the source of water."

Aristotle's *Meteorics* are also quoted by name in § XXIII., but nowhere else directly by Dante. He probably refers to Bk. II. seven times altogether; and in the Convito twice quotes Albertus Magnus "*della Meteora.*"

[3] The moon as the cause of the tides is the first Anticipation noted by Stoppani. Giuliani, Dr. Moore, and others have shown in the quotations given below, and others, that the author was not propounding anything very new, while his expression in § XXIII, *corpus imitabile orbis lunae*, does not suggest a scientific forger.

Par. XVI. 82–3. "And as the turning of the lunar heaven
Covers and bares the shores without a pause."

Lucan. *Pharsalia.* X. 204. "The moon mingles land and sea with her changes."

Pliny. *Nat. Hist.* II. 97. "Very wonderful the flux and reflux of the tossing sea, and varied the manner thereof, but the cause lies in the sun and the moon."

S. Thomas Aquinas. *S.* I. 110.3. "The flux and reflux of the sea does not depend on the material form of the waters, but on the virtue of the moon."

§ IX. Hic erit ordo. Primo demonstrabitur impossibile, aquam in aliqua parte suae circumferentiae altiorem esse hac terra emergente sive detecta. Secundo demonstrabitur, terram hanc emergentem esse ubique altiorem totali superficie maris. Tertio instabitur contra demonstrata, et solvetur instantia.[1] Quarto ostendetur causa finalis et efficiens huius elevationis sive emergentiae terrae. Quinto solvetur ad argumenta superius praenotata.

§ X. Dico ergo propter primum, quod si aqua, in sua circumferentia considerata, esset in aliqua parte altior quam terra, hoc esset de necessitate altero istorum duorum modorum; vel quod aqua esset excentrica, sicut prima et quinta ratio procedebat; vel quod, excentrica[2] existens, esset gibbosa[3] in aliqua parte, secundum quam terrae supereemineret: aliter esse non posset,[4] ut subtiliter[5] inspicienti satis manifestum est. Sed neutrum istorum est possibile: ergo[6] nec illud ex quo, vel per quod, alterum sequebatur.[7] Consequentia, ut dicitur, est manifesta

[1] *Par.* II. 94–5. "Da questa instanzia può diliberarti
Esperienza."
Con. IV. xxii. 98. "Qui non ha luogo l' istanza."
De Mon. II. vi. 67. "Instantia nulla est."
De Mon. III. v. 36–7. "Et sic instantia videtur errare."
De Mon. III. vii. 23. "Et si quis instaret."

[2] Almost all editors correct the obvious textual error, and read *Concentrica.*

[3] *Par.* XXI. 109. "E fanno un gibbo che si chiama Catria."

[5] *Inf.* XXXI. 53. "Chi guarda sottilmente."
Par. VII. 88–9. ". . . Se tu badi.
Ben sottilmente."
Par. XIX. 82. "Certo a colui che meco s' assottiglia."
Par. XXVIII. 63. "Ed intorno da esso t' assottiglia."

[6] Angelitti. *Rassegna,* p. 5. "Ergo nec illud, ex quo alterum vel alterum sequebatur."

[7] Cf. the parallel specific use of sequebatur in § VI.

§ IX. This will be the order. First, we shall demonstrate that it is impossible for water in any part of its circumference to be higher than the emergent or uncovered land. Secondly, we will show that this emerging land is everywhere higher than the whole surface of the sea. Thirdly, we shall argue against our conclusion and refute the objections.[1] Fourthly, we shall show the final and efficient cause of this elevation or emerging of the land. Fifthly, we shall refute the arguments above set down.

§ X. I therefore say, in the first place, that if water, considered in its circumference were in any place higher than the earth this would necessarily be in one of these two ways: either because the water was excentric, as the first and fifth reasons assumed; or because being concentric it was gibbous[3] in some part, at which it would overtop the earth: Otherwise this could not be so,[4] as is sufficiently evident to one who considers subtly.[5] But neither of these ways is possible: hence[6] neither the fact from which, nor the argument by which, the contrary hypothesis proceeded is admissible. The conclusion, as stated, is

[1] *Par.* II. 94. "From this reply experiment will free thee."

Conv. IV. xxii. 98. "There is no place here for such an objection."
De Mon. II. vi. 67. "The example proves nothing."
De Mon. III. v. 36–7. "Therefore their objection appears to err."
De Mon. III. vii. 23. "And if any one raises the objection."

[3] *Par.* XXI. 109. "And form a ridge that Catria is called."

[4] i. e.: If the water were not excentric or gibbous, it could not be higher than the earth.

[5] *Inf.* XXXI. 53. "Whosoever looketh subtly."
Par. VII. 88–9. ". . . If thou notest
With nicest subtilty."
Par. XIX. 82. "Truly to him who with me subtilizes."
Par. XXVIII. 63. "And exercise on that thy subtlety."
See also *Conv.* II. ix. 107–8; II. xiv. 143; II. xv. 24–5; IV. i. 58–9.

[6] This difficult passage based on the obscure mediaeval scholastic terms might be rendered: "Therefore neither that *ex quo* nor that *per quod* can be deduced from the contrary supposition." The *ex quo* is the fact from which another derives; the *per quod* the means of that process.

Sig. Angelitti's reading is certainly preferable: "Therefore that is not possible which was deduced from one or the other."

per[1] locum a sufficienti divisione causae; impossibilitas consequentis, per ea quae ostendentur, apparebit.

§ XI. Ad evidentiam igitur dicendorum, duo supponenda sunt: [2] primum est, quod aqua naturaliter movetur deorsum; secundum est, quod aqua est labile corpus naturaliter, et non terminabile termino proprio.[3] Et si quis haec duo principia vel alterum ipsorum negaret, ad ipsum non esset determinatio; quum contra negantem principia alicuius scientiae non est disputandum in illa scientia,[4] ut patet ex primo *Physicorum:* sunt etenim haec principia inventa sensu et inductione, quorum est talia invenire, ut patet ex primo *ad Nichomachum.*

§ XII. Ad destructionem igitur primi membri consequentis dico, quod aquam esse excentricam est impossibile: quod sic demonstro: Si aqua esset excentrica, tria impossibilia sequerentur; quorum primum est, quod aqua esset naturaliter movibilis sursum et deorsum; secundum est, quod aqua non moveretur deorsum per eandem lineam cum terra; tertium est, quod gravitas equivoce praedicaretur de ipsis: quae omnia

1 Dr. Moore reads *de.*

2 *De Mon.* III. iv. 45–7. "Ad meliorem . . . evidentiam, advertendum quod." *De Vulg. Eloq.* II. ii. 46–7. "Ad quorum evidentiam sciendum est, quod."

3 Latini. *Trésor.* I. Part iii. Ch. 106. "Il est propre nature des aigues que eles montent tant comme eles avalent."

4 *De Mon.* III. iii. 122–4. "Nam cur ad eos ratio quaereretur, quum . . . principia non viderent?"

Conv. IV. xv. 159–64. "E di costoro dice il Filosofo, che non è . . . d' avere con essi faccenda, dicendo nel primo della *Fisica,* che contro a quello che niega li principii 'disputare non si conviene.'"

manifest in its place [by?] a sufficient analysis of the causes. The impossibility of the deduction will appear from our future exposition.

§ XI. For the clear understanding of the discussion two things must be granted:[2] the first, that water naturally moves downwards; the second, that water is naturally a fluid body, and not limitable by a special limit.[3] And if any one should deny these two axioms, or either thereof, it would be impossible to convince him; for there is no disputing with a man about a science the first principles of which he denies,[4] as is clear from the first of the Physics:[5] because truly these axioms are founded on observation and induction, the province of which is to discover such axioms, as is clear from the first of the Ethics.[6]

§ XII. To overthrow the first part of the deduction, therefore, I say, that it is impossible for water to be excentric: and I prove it thus: If water were excentric three impossibilities would follow; of which the first is, that water would be naturally movable upwards as well as downwards; the second, that water would not be moved downwards along the same line as earth; the third, that gravity would be predicated ambiguously of these two elements: all of which are evidently not only

[2] *De Mon.* III. iv. 45–7. "To make it more clear . . . we must remark."

De Vulg. Eloq. II. ii. 46–7. "In order to make this clear, it must be observed that . . ."

[3] The uniformity of the sea-level is the second Anticipation noted by Stoppani. Apart from the references below, which Dr. Moore quotes from books certainly known to Dante, written by Dante's two teachers, there is surely nothing previously so unheard of in these axioms.

Arist. *De Coelo.* II. xiv. (297 *b.* 7–9).

Latini. *Trésor.* I. 106. "It is the nature of water to rise as far as it falls."

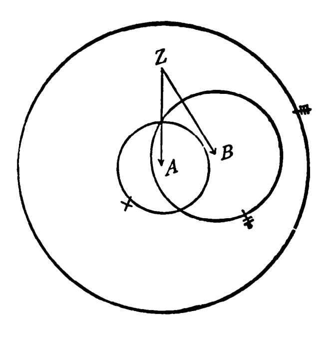
[4] *De Mon.* III. iii. 122–4. "Why should we seek to reason with these, when they . . . cannot even see our first principle?"

Conv. IV. xv. 159–64. "The Philosopher says, we are not . . . to have anything to do with them, saying, in the first of the *Physics*, that with him who denies first principles it is not fitting to dispute."

[5] Arist. *Physics.* I. ii. (185 *a.* 1–3).

[6] Arist. *Ethics.* I. vii. 21 (1098 *b.* 3). A chapter six times referred to by Dante.

non tantum falsa sed impossibilia esse videntur. Consequentia declaratur sic: Sit coelum circumferentia, in qua tres cruces, aqua in qua duae, terra in qua una; et sit centrum coeli et terrae punctus in quo A: centrum vero aquae excentricae punctus in quo B, ut patet in figura signata. Dico ergo, quod si aqua erit in A, et habeat transitum, naturaliter movebitur ad B; quum omne grave moveatur ad centrum propriae circumferentiae naturaliter; et quum moveri ab A ad B sit moveri sursum; quum A sit simpliciter deorsum ad omnia; aqua movebitur naturaliter sursum: quod erat primum impossibile, quod supra dicebatur. Praeterea sit gleba[1] terrae in Z, et ibidem sit quantitas aquae, et absit omne prohibens: quum igitur, ut dictum est, omne grave moveatur ad centrum propriae circumferentiae,[2] terra movebitur per lineam rectam ad A, et aqua per lineam rectam ad B; sed hoc oportebit esse per lineas diversas, ut patet in figura signata; quod non solum est impossibile, sed rideret Aristoteles,[3] si audiret:[4] et hoc erat secundum quod declarari debebatur. Tertium vero declaro sic: Grave et leve sunt passiones corporum simplicium, quae moventur motu recto;[5] et levia moventur sursum, gravia vero deorsum.[6] Hoc enim intendo per grave



[1] *De Mon.* I. xv. 38–40. "Nam sicut plures glebas diceremus concordes, propter condescendere omnes ad medium."

[2] *Inf.* XXXII. 73–4. ". . . In ver lo mezzo
Al quale ogni gravezza si raduna."
Inf. XXXIV. 110–1. ". . . Il punto
Al qual si traggon d' ogni parte i pesi."

[3] Aristotle so called by Dante three times elsewhere.

[4] *Conv.* IV. xv. 58–9. "E senza dubbio forte riderebbe Aristotile, udendo."

[5] Albertus Magnus. *De Nat. Loc.* I. 3. "Locus igitur ignis erit in concavo lunae super omnia corpora habentia motum rectum."

[6] *Conv.* III. iii. 8–11. "Le *corpora semplici* hanno amore naturato in sè al loro loco proprio, e però la terra sempre discende al centro."

false but impossible. Let the conclusion be stated thus: Let heaven be the circumference marked with three crosses, water that with two, earth that with one; and let the center of heaven and earth be the point A, and the center of the excentric water the point B, as in the figure. I say, then, that if there were water at A, and it had passage, it would naturally be moved to B: since every heavy body is moved naturally to the center of its own circumference; and since to be moved from A to B is to be moved upward inasmuch as A is simply beneath everything: water would be moved naturally upward, which was the first impossibility, mentioned above. Again, let there be a clod [1] of earth at Z, and at the same point a certain amount of water, and let nothing oppose them: since, then, as we have said, every heavy body is moved to the center of its own circumference, [2] the earth would be moved along a straight line to A, and the water along a straight line to B; but this would necessarily be along different lines, as appears from the figure; which is not merely impossible, but Aristotle would laugh were he to hear it: [4] and this was the second impossibility to be made clear. The third, truly, I demonstrate thus: Heaviness and lightness are qualities of simple bodies, which move with right-line motion; [5] the light move upward, the heavy downward.[6] For by heavy and light I

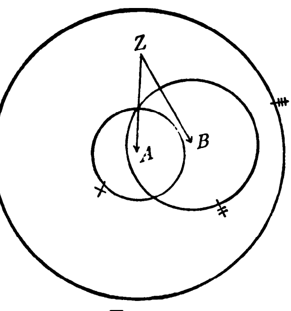


FIG. 3.

[1] *De Mon.* I. xv. 38–40. "For as we should say that many clods of earth are concordant, because they all gravitate together towards the center."

[2] *Inf.* XXXII. 73–4. " . . . Tow'rds the middle,
Where everything of weight unites together."
Inf. XXXIV. 110–1. " . . . The point
To which things heavy draw from every side."

[4] *Conv.* IV. xv. 58–9. "And undoubtedly Aristotle would have laughed heartily to hear . . . "

[5] Albertus Magnus. *De Nat. Loc.* I. 3. "The region of fire, then, lies in the concave of the moon, above all bodies having right-line motion."

[6] *Conv.* III. iii. 8–11. "Simple bodies have a natural love for their own place; wherefore *earth* always falls towards the center."

et leve, quod sit mobile; sicut vult Philosophus in *Coelo et Mundo*. Si igitur aqua moveretur ad B, terra vero ad A; cum ambo sint corpora gravia, movebuntur ad diversa deorsum; quorum una ratio esse non potest, quum unum sit deorsum simpliciter, aliud vero secundum quid. Et cum diversitas in ratione finium arguat diversitatem in iis quae sunt propter illa, manifestum est quod diversa ratio fluitatis erit in aqua et in terra: et quum diversitas rationis cum identitate nominis equivocationem faciat, ut patet per Philosophum in *Antepraedicamentis*,[8] sequitur quod gravitas equivoce praedicetur de aqua et terra: quod erat tertium consequentiae membrum declarandum. Sic igitur patet per veram demonstrationem de genere illarum, qua demonstravi non esse hoc, quod aqua non est excentrica: quod erat primum consequentis principalis consequentiae quod destrui debebatur.

§ XIII. Ad destructionem secundi membri consequentis principalis consequentiae dico, quod aquam esse gibbosam est etiam impossibile; quod sic demonstro: Sit coelum, in quo quatuor cruces, aqua in quo tres, terra in quo duae; et centrum terrae et aquae concentricae et

Conv. III. iii. 41–3. "Chè per la natura del *semplice corpo*, che nel suggetto signoreggia, naturalmente ama l' andare in giù."

De Mon. I. xv. 46–8. "Qualitas una formaliter in glebis, scilicet gravitas, et una in flammis, scilicet levitas."

Conv. IV. ix. 55–7. "Perchè noi volessimo che le cose gravi salissino per natura suso, non potrebbono salire."

8 Arist. *Categ.* I. init. (I*a*. 1–4). "Aequivoce dicuntur, quorum nomen solum commune est, secundum nomen vero substantiae ratio diversa."

understand that which is movable, as the Philosopher asserts in Heaven and Earth.[1] If, therefore, water were moved to B, and earth to A, since both are heavy bodies, they would be moved downwards to different points — for which there could not be a single cause, since one is directly downwards, but the other only relatively so. Since difference in the cause of results implies differences in whatsoever depends thereon, it is manifest that the cause of fluidity [2] would differ in water and in earth; and since a different cause and identical name results in an equivocation, as is clear from the Philosopher in his Categories,[3] it follows that gravity would be predicated ambiguously for water and earth: which was the third part of the deduction to be cleared away. Thus then it results from the true demonstration of the nature of these things (by which I have demonstrated that this cannot be), that water is not excentric — which was the first deduction drawn from the main conclusion that was to be overthrown.

§ XIII. To overthrow[4] the second deduction of the main conclusion I say, that it is impossible for water to be gibbous: and I prove it thus. Let heaven be [the circumference] with four crosses, water that with three, earth that with two; and let the center of the concentric earth and water, and heaven, be at D. And first be it granted that the water

Conv. III. iii. 41–3. "Therefore, as far as the nature of *simple bodies* predominates in man, he naturally likes to descend."

De Mon. I. xv. 46–8. "There is one quality formally in the clods of earth, that is gravity, and one in the flame of fire, that is lightness."

Conv. IV. ix. 55–7. "Because we may wish that heavy things should rise naturally, they cannot therefore rise."

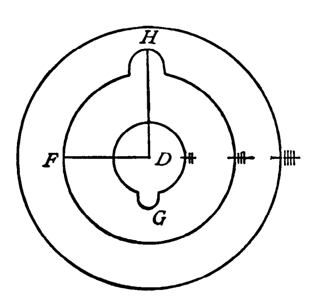
[1] Arist. *De Coelo.* IV. i. (307 *b.* 31). This particular book is not quoted elsewhere by Dante.

[2] Does not the use of fluitatis (or fluiditatis?) instead of gravitatis, disprove any accurate knowledge of the latter word by the author of the treatise?

[3] Arist. *Categ.* I. init. (I *a.* 1–4). "Things are termed homonymous, of which the name alone is common, but the definition (of substance according to the name) is different."

[4] See Arist. *De Coelo.* II. iv. (287 *b.* 4–14) for a similar, though not quite parallel, argument and diagram.

coeli sit D. Et praesciatur hoc, quod aqua non potest esse concentrica terrae, nisi terra sit in aliqua parte gibbosa supra centralem circumferentiam, ut patet instructis in mathematicis. Si in aliqua parte emergit circumferentia aquae, et ideo gibbus aquae sit in quo H, gibbus vero terrae in quo G: deinde protrahatur linea una a D ad H, et una alia a D ad F; manifestum est quod linea quae est a D ad H est longior quam quae est a D ad F; et per hoc summitas eius est altior summitate alterius: et cum utraque contingat in summitate sua superficiem aquae, neque transcendat; patet quod aqua gibbi erit sursum per respectum ad superficiem ubi est F. Cum igitur non sit ibi prohibens (si vera sunt quae prius supposita erant), aqua gibbi dilabetur, donec[1] coaequetur ad D cum circumferentia centrali sive regulari: et sic impossibile erit permanere gibbum, vel esse; quod demonstrari debebat. Et praeter hanc potissimam demonstrationem, potest etiam probabiliter ostendi, quod aqua non habeat gibbum extra circumferentiam regularem; quia quod potest fieri per unum, melius est quod fiat per unum quam per plura:[2] sed totum oppositum[3] potest fieri per solum gibbum terrae, ut infra patebit: ergo non est gibbus in aqua; quum Deus et natura semper faciat, et velit quod melius est, ut patet per Philosophum *de Coelo et Mundo*,[4] et secundo *de Generatione*



[1] Dr. Moore (I. 128) calls attention to this passage; "*ὥστε περιρρεύσεται τὸ ὕδωρ ἕως ἂν ἰσασθῇ . . . σφαιροειδὴς ἄρα ἡ τοῦ ὕδατος ἐπιφάνεια.*"

[2] *De Mon.* I. xiv. 1–3. "Et quod potest fieri per unum, melius est per unum fieri quam per plura."

De Mon. I. xiv. 21–2. "Sed fieri per unum est propinquius fini, ergo est melius."

Dr. Moore (I. 116). "*ἀρχὴν δὲ τούτων ἀναγκαῖον εἶναι μίαν · ὅπου γὰρ ἐνδέχεται, μίαν βέλτιον ἢ πολλάς.*"

[3] Angelitti, p. 8, suggests that *totum oppositum* may be a corruption of *terrae emersio*, but he does not state on what grounds he makes the suggestion.

[4] *De Mon.* I. iii. 21–2. "Propter quod sciendum est primo, quod Deus et natura nil otiosum facit."

De Mon. I. xiv. 12–3. "Omne superfluum Deo et Naturae displiceat."

cannot be concentric with the earth, unless the earth be in some place gibbous over its central circumference, as is evident to those versed in mathematics. If the circumference of the water emerges anywhere, let the excrescence of the water be at H, and the excrescence of the earth at G: then if a line be drawn from D to H, and another from D to F, clearly the line DH is longer than the line DF; and therefore its vertex is higher than the vertex of the latter; and since each touches at its vertex the surface of the water, but does not cut it, it is clear that the water of the excrescence is higher than the surface at the point F. So, as there is nothing to oppose it there, if our previous suppositions are true, the water of the excrescence will be diffused, until[1] it becomes equally far from D as the central or regular circumference: and so it is impossible for an excrescence to remain, or to exist; which was to be demonstrated. And besides this rigorous proof, we can show it to be probable that water has no excrescence beyond its regular circumference; for what can be done by one, is better done by one than by many:[2] but the whole opposite[3] can be effected by the excrescence of the earth only, as will be evident later: therefore there is no excrescence in the water; for God and Nature always do and will what is best, as is clear from the Philosopher in Heaven and Earth[4]

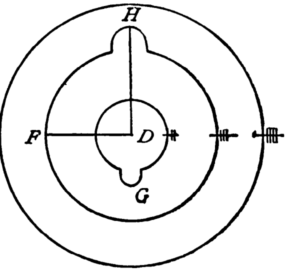


FIG. 4.

[1] Arist. *De Coelo.* l. s. "So the water scatters until it becomes level, . . . and its shape is that of a sphere."

[2] *De Mon.* I. xiv. 1–3. "And where a thing can be done by one agent, it is better to do it by one than by several."

De Mon. I. xiv. 21–2. "But for a thing to be done by one agent is better, for so it comes nearer to the end."

Arist. *De Part. Anim.* III. iv. (665 *b.* 14–5). "The beginning of these things must needs be one; for wherever it is practicable, one is better than many."

[3] i. e., the excentricity of the water.

[4] Arist. *De Coelo.* I. iv. (271 *a.* 33 and elsewhere).

De Mon. I. iii. 21–2. "Let it then be understood that God and nature make nothing to be idle."

De Mon. I. xiv. 12–3. "All that is superfluous is displeasing to God and Nature."

Animalium.[1] Sic igitur patet de primo sufficienter; videlicet, quod impossibile est aquam in aliqua parte suae circumferentiae esse altiorem, hoc est remotiorem a centro mundi, quam sit superficies huius terrae habitabilis: quod erat primum in ordine dicendorum.

§ XIV. Si ergo impossibile est aquam esse excentricam ut per primam figuram demonstratum est; et esse cum aliquo gibbo, ut per secundam est demonstratum: necesse est, ipsam esse concentricam et coaequam, hoc est aequaliter in omni parte suae circumferentiae distantem a centro mundi: ut de se patet.[2]

§ XV. Nunc arguo sic: Quidquid supereminere alicui parti circumferentiae distantis aequaliter a centro, est remotius ab ipso centro quam aliqua pars ipsius circumferentiae; Sed omnia littora tam ipsius Amphitritis,[3] quam marium mediterraneorum supereminent superficiei contingentis maris, ut patet ad oculum: Ergo omnia littora sunt remotiora a centro mundi, quum centrum mundi sit et centrum maris (ut visum est), et superficies littorales sint partes totalis superficiei maris. Et quum omne remotius a centro sit altius, consequens est quod littora omnia sint supereminentia toto[4] mari;[5] et si littora, multo magis aliae regiones terrae, quum littora sint inferiores partes terrae; et id flumina ad illa descendentia manifestant. Maior vero huius demonstrationis demon-

[1] *Par.* VIII. 113–4. ". . . Impossibil veggio
Che la natura, in quel ch'è uopo, stanchi."

Conv. IV. xxiv. 106–7. "La buona Natura, che non vien meno nelle cose necessarie."

De Mon. II. vii. 2–3. "Natura enim in providendo non deficit ab hominis providentia."

[2] *De Mon.* III. ii. 25, etc. "Ut de se patet."

[3] Boehmer reads *Amphitrites.*

Epist. VII. 58. "Fluctus Amphitritis."

[4] Boehmer reads *toti.*

[5] "*Il Libro di Novelle*" (*c. 1285*), p. 103. "La terra si è più alta assai che llo mare; chè lla più bassa ripa del mondo è più alta che 'l mare."

and in the second of the Generation of Animals.[1] So the first is sufficiently plain, that it is impossible for water in any part of its circumference to be higher — that is, farther from the center of this world — than is the surface of this habitable earth. And this was the first point in the order of the discussion.

§ XIV. If, then, it is impossible for water to be excentric, as proved by the first figure; or to have any excrescence, as proved by the second — it must be concentric and of one level, that is, in every part of its circumference equidistant from the center of the world, as is self-evident.[2]

§ XV. Now I argue thus: Whatever overtops some part of a circumference equidistant from its center is further from that center than any part of that circumference. But every shore of the Ocean [3] as well as of the inland seas overtops the surface of the adjacent sea, as is clear to the eye. Therefore all shores are further from the center of the world, since, as we have seen, the center of the world is also the center of the seas, and the surface along the shores is part of the whole surface of the seas. And since everything further from the center of the world is higher, it follows that all the shores are more elevated than the whole sea;[5] and if the shores, then much more the other regions of the earth, since the shores are the lowest regions of the earth, as the rivers that flow down thereto show. The major premise of this proof, indeed, is proved by geometric theorems; and the proof

1 Arist. *De Gen. Anim.* II. vi. (744 *a.* 36 — and elsewhere in Bk. II.).

Par. VIII. 113-4. ". . .'T is impossible
That nature tire, I see, in what is needful."

Conv. IV. xxiv. 106-7. "Bountiful Nature, who never fails to provide all necessary things."

De Mon. II. vii. 2-3. "Nature in its providence does not come short of men's providence."

2 *De Mon.* III. ii. 25, etc. "As is self-evident."

3 In Albertus Magnus: Amphitrix = circumambient ocean.

Epist. VII. 58. "The waves of Amphitrite."

5 Dr. Moore. II. 370. quotes: "*Il Libro di Novelle et di Bel Parlare Gientile:*" "The land is considerably higher than the sea; for the lowest shore of the land is higher than the sea."

stratur in theorematibus geometricis; et demonstratio est ostensiva, licet vim suam habeat, ut in iis quae demonstrata sunt superius per impossibile. Et sic patet de secundo.[1]

§ XVI. Sed contra ea quae sunt determinata, sic arguitur. Gravissimum corpus aequaliter undique ac potissime petit centrum; terra est gravissimum corpus; ergo aequaliter undique ac potissime petit centrum. Et ex hac conclusione sequitur, ut declarabo, quod terra aequaliter in omni parte suae circumferentiae distet a centro, per hoc quod dicitur *aequaliter:* et quod sit substans omnibus corporibus, per hac quod dicitur *potissime;* unde sequeretur (si aqua esset concentrica, ut dicitur), quod terra undique esset circumfusa et latens; cuius contrarium videmus. Quod illa sequantur ex conclusione, sic declaro: Ponamus per contrarium sive oppositum consequentis illius, quod est[2] in omni parte aequaliter distare, et dicamus quod non distet; et ponamus quod ex una parte superficies terrae distet per viginti stadia, ex alia per decem: et sic unum hemisphaerium eius erit maioris quantitatis quam alterum: nec refert utrum parum vel multum diversificentur in distantia, dummodo diversificentur. Quum ergo maioris quantitatis terrae sit maior virtus ponderis, hemisphaerium maius per virtutem sui ponderis praevalentem impellet hemisphaerium minus, donec adaequetur quantitas utriusque, per cuius adaequationem adaequetur pondus; et sic undique redibit ad distantiam quindecim stadiorum: sicut et videmus in appensione ac adaequatione ponderum in bilancibus. Per quod patet quod impossibile est terram aequaliter centrum petentem diversimode sive inaequaliter in sua circumferentia distare ab eo. Ergo necessarium est oppositum suum inaequaliter distare; quod est aequaliter distare,[3] quum distet; et sic declarata est consequentia, ex parte eius quod est aequaliter distare. Quod etiam sequatur, ipsam substare omnibus corporibus (quod sequi etiam ex conclusione dicebatur), sic declaro. Potissima virtus potissime attingit finem;[4] nam per hoc potis-

[1] *De Mon.* II. vi. 67–8. "Patet igitur quod quaerebatur."

[2] Boehmer places the comma after, instead of before, *quod est.*

[3] Boehmer reads *aqua quum distet* instead of *aequaliter distare.*

[4] *Conv.* I. v. 71–4. "Ciascuna cosa è virtuosa in sua natura, che fa quello a che ella è ordinata; e quanto meglio lo fa, tanto è più virtuosa.'

is self-evident, besides having its own force, as those had that were proved above by the theory of impossibility. And so this second point is clear.[1]

§ XVI. But against these conclusions which we have reached, it is argued as follows: the heaviest body equally and most forcibly seeks its center from every side; earth is the heaviest body; hence equally and most forcibly it seeks its center from every side. From this hypothesis it follows, as I will show, that earth at every point of its circumference is equidistant from its center — from the definition of the word "equally;" and that it lies beneath all other bodies — from the definition of the words "most forcibly;" whence it would follow (if water were concentric, as is asserted) that the earth was everywhere surrounded and hidden; but we see the contrary of this. That this follows from the hypothesis, I show thus: Let us suppose the contrary or converse of this hypothesis, that (earth) is everywhere equidistant, and let us say it is not equidistant; and let us suppose that on one side the surface of the earth is twenty furlongs from the center, on the other ten: so one hemisphere of the earth will have greater volume than the other: nor does it matter whether they differ in distance more or less, as long as they do differ. Since therefore the greater volume of earth has the more efficient weight, the greater hemisphere by the prevailing efficiency of its weight will press upon the lesser hemisphere, until the volume of each becomes equal, by which equality the weight will become equal, and so both sides will return to a distance of fifteen furlongs — just as in the weighing and equating of weights in a balance. Hence we see that it is impossible for earth equally seeking the center to be differently or unequally distant therefrom in its circumference. Therefore the converse of its being unequally distant is necessary; that is, it must be equidistant at every point of its distance. And so the conclusion is made clear, in respect to the fact that it is equidistant. That it also follows that the earth lies beneath all substance (as was said to follow from the hypothesis) I show thus: — the most powerful efficiency most powerfully reaches its end;[4] according to the proposi-

[1] *De Mon.* II. vi. 67–8. "What was sought, therefore, is clear."

[4] *Conv.* I. v. 71–4. "Everything is virtuous in its nature that fulfils the purpose for which it was ordained; and the better it does this, the more virtuous it is."

sima est, quod citissima est, quod citissime ac facillime finem consequi potest; potissima virtus gravitatis est in corpore potissime petente centrum, quod quidem est terra; ergo ipsa potissime attingit finem gravitatis, qui est centrum mundi; ergo substabit omnibus corporibus, si potissime petit centrum :[2] quod erat secundo declarandum. Sic igitur apparet esse impossibile quod aqua sit concentrica terrae; quod est contra determinata.

§ XVII. Sed ista ratio non videtur demonstrare, quia propositio maioris principalis similiter non videtur habere necessitatem. Dicebatur enim, gravissimum corpus aequaliter undique ac potissime petere centrum; quod non videtur esse necessarium: quia licet terra sit gravissimum corpus comparatum ad alia corpora; comparatum tamen in se, scilicet in[3] suas partes, potest esse gravissimum et non gravissimum; quia posset esse gravior terra ex una parte quam ex altera. Nam quum adaequatio corporis gravis non fiat per quantitatem, in quantum quantitas, sed per pondus; poterit ibi esse adaequatio ponderis, quod non sit ibi adaequatio quantitatis; et sic illa demonstratio est apparens, et non existens.

§ XVIII. Sed talis instantia nulla est, procedit enim ex ignorantia naturae homogeneorum et simplicium: corpora enim homogenea et simplicia sunt; homogenea, ut aurum depuratum ;[4] et corpora simplicia, ut ignis et terra,[5] regulariter in suis partibus qualificantur omni naturali

[2] Brunetto Latini. *Trésor*. I. 105. "Toutes choses se traient et vont tozjors au plus bas, et la plus basse chose e la plus parfonde qui soit au monde est li poins de la terre, ce est li mileu dedans, qui est apelez abismes, là où enfers est assis."

[3] Angelitti suggests reading *secundum*, instead of *scilicet in*.

[4] *De Mon.* I. iii. 48–50. "Nec esse complexionatum, quia hoc etiam reperitur in mineralibus."

[5] *De Vulg. Eloq.* I. xvi. 51–2. "Magis in minera, quam in igne: in igne, quam in terra."

Conv. III. iii. 10–3. "La terra sempre discende; . . . il fuoco . . . sempre sale."

tion that that is most powerful which is most swift, since it can most swiftly and easily attain its end; the most powerful efficiency of gravity lies in the body most powerfully seeking the center, namely, the earth; hence the earth most powerfully attains the end of gravity, which is the center of the globe;[1] hence it lies underneath all substances if it seeks the center[2] most powerfully: which was the second point to be made clear. So, then, it seems impossible for water and earth to be concentric, because it is contrary to what has now been established.

§ XVII. But the reasoning does not seem to hold: since the principal proposition of the major premise does not in truth seem to have necessity. For it was said, the heaviest body everywhere equally and most forcibly seeks its center — but this is not necessarily true: for, although the earth is the heaviest body compared to other bodies, compared to itself, namely, to its parts, it may be most heavy or not most heavy — for earth may be heavier in one part than in another. And inasmuch as the equating of heavy bodies is not brought about by quantity in the sense of mass, but by weight: there might be equation of weight where there was no equation of mass; and so that proof is apparent, and not real.

§ XVIII. But such an objection amounts to nothing, and proceeds from ignorance of the nature of homogeneous and simple bodies; for there are homogeneous and there are simple bodies; homogeneous, such as refined gold;[4] and simple, such as fire and earth,[5] which reg-

[1] The force of gravity is the third of Stoppani's Anticipations. The author uses the term *gravitas* several times in the Treatise — but, in his own words, *diversitas rationis cum identitate nominis equivocationem faciat.* The centripetal force of Dante and the author of the *Quaestio* differs as much from that of Newton, as the *passiones grave et leve* of the *Quaestio* from modern atoms and molecules.

[2] Brunetto Latini. *Trésor*. I. 105. "All things draw and move ever to the bottom, and the lowest and deepest spot in the world is that point of the earth which is the center, which is called the abyss, there where hell is seated."

[4] Minerals and elements are frequently distinguished by Dante.

De Mon. I. iii. 48–50. "Nor is it existence under complex conditions; for we find this in minerals too."

[5] Dr. Moore suggests that when Dante speaks of the elements, without mentioning all four, he selects Earth and Fire, as the two extremes.

De Vulg. Eloq. I. xvi. 51–2. "God is more perceptible in a mineral than in fire, in fire than in earth."

Conv. III. iii. 10-3. "*Earth* always falls . . . and *fire* . . . always mounts."

passione. Unde cum terra sit corpus simplex, regulariter in suis partibus qualificatur naturaliter et per se, sic loquendo:[1] quare cum gravitas insit naturaliter terrae, et terra sit corpus simplex; necesse est ipsam in omnibus partibus suis regularem habere gravitatem, secundum proportionem quantitatis: et sic perit ratio instantiae principalis. Unde respondendum est, quod ratio instantiae sophistica est, quia fallit secundum quid, et simpliciter propter quod. Sciendum est quod natura universalis non frustratur suo fine: unde licet natura particularis aliquando propter inobedentiam[2] materiae ab intento fine frustretur; natura tamen universalis nullo modo potest a sua intentione deficere, quum naturae universali aequaliter actus et potentia rerum, quae possunt esse et non esse, subiaceant. Sed intentio naturae universalis est, ut omnes formae quae sunt in potentia materiae primae,[4] reducantur in actum: et secundum rationem speciei sint in actu; ut materia prima, secundum suam totalitatem, sit sub omni forma materiali, licet secundum partem sit sub omni privatione[5] opposita, praeter unam. Nam cum omnes formae, quae sunt in potentia materiae idealiter, sint in actu in motore coeli, ut dicit Commentator in *de Substantia Orbis;*

[1] Boehmer reads: *Quum terra sit corpus simplex, regulariter in suis partibus qualificatur naturaliter et per se loquendo.*

[2] *Par.* I. 129. "Perch' a risponder la materia è sorda."

De Mon. II. ii. 29–31. "Quidquid in rebus inferioribus est peccatum, ex parte materiae subiacentis peccatum sit."

[4] *Conv.* IV. i. 63–5. "Io cercava se la prima materia degli elementi era da Dio intesa."

[5] *Conv.* II. xiv. 138–40. "Li principii delle cose naturali . . . cioè *materia, privazione* e *forma.*"

ularly throughout their parts are possessed of all their natural characteristics. Whence, since earth is a simple body, it is possessed regularly throughout its parts of these characters naturally and by itself, so to speak: wherefore, as gravity naturally inheres in earth and as earth is a simple body, it must necessarily have equal gravity throughout its parts in direct proportion to their mass: and so the main reasoning of the objection falls through. Accordingly, it is to be answered, that the reasoning of the objection is sophistical, being without method or even foundation. We know that Universal Nature never fails to attain its ends; wherefore, although Particular Nature sometimes fails of the end it aims at, owing to the stubbornness[2] of matter, yet Universal Nature can in no wise fail of its aim, since the activity and potentiality of things, which are capable of being and not being, are subject to Universal Nature.[3] But the aim of Universal Nature is that all forms existent in potentiality in primary matter[4] should be brought into act, and should exist in act according to the nature of their species; so that though primary matter, in respect to its sum, underlies every material form, yet in respect to a part of it, it may underlie every opposite privation[5] save one. For as all forms, which ideally exist potentially in matter, are in act in the Mover of the Heavens, according to the Commentator in the Substance of the World;[6] if all these

[2] *Par.* I. 129. "Because in answering is matter deaf."

De Mon. II. ii. 29–31. "Whatever fault is to be found in the lower world is a fault on the part of the subject matter."

[3] Dr. Moore (II. 333.) dwells on the Dantesque character of this passage. Dante drew his distinction between Universal and Particular Nature (four times mentioned in the *Convito*) from Albertus Magnus (*Physica.* II. i. v.), or more likely from St. Thomas Aquinas (*S.* i. 22. 2.).

[4] *Conv.* IV. i. 63–5. "I sought to find out if the first matter of the elements were created by God."

[5] The passage is technical and obscure. In Aristotle *privation* (στέρησις) is the lowest grade of metaphysical reality — thought of in abstract, as deprived of all form; opposite to Godhead — the absolutely pure exclusion of all possibility of Becoming.

Conv. II. xiv. 138–40. "The principles of natural things, which are three: matter, privation, and form."

[6] Mr. Toynbee thinks the author drew this opinion from Albertus Magnus (*De Nat. et Orig. Anim.* II. vii.); but he considers the *De Substantia Orbis* to be the source of Dante's Lunar Theory as given in the *Convito.*

si omnes istae formae non essent semper in actu, motor coeli[1] deficeret ab integritate diffusionis suae bonitatis: quod non esset dicendum.[2] Et quum omnes formae materiales generabilium et corruptibilium, praeter formas elementorum, requirant materiam et subiectum[3] mixtum et complexionatum, ad quod, tanquam ad finem, ordinata sunt elementa in quantum elementa;[4] et mixtio esse non possit, ubi miscibilia simul esse non possunt, ut de se patet: necesse est, esse partem in universo ubi omnia miscibilia, scilicet elementa, convenire possint: haec autem esse non posset, nisi terra in aliqua parte emergeret,[5] ut patet intuenti. Unde cum intentioni naturae universalis omnis natura obediat; necesse fuit etiam praeter simplicem naturam[6] terrae, quae est esse deorsum, inesse aliam naturam[7] per quam obediret intentioni universalis naturae; ut scilicet pateretur elevari[8] in parte a virtute coeli, tanquam obediens a praecipiente:[9] sicut videmus de concupiscibili et irascibili in homine:

[1] *Par.* I. i. "La gloria di colui che tutto move."
Par. II. 129. "Dai beati motor."
De Mon. I. ix. 12. "Et unico motore, qui Deus est."
Epist. X. 349–50. "*Gloria primi Motoris,* qui Deus est."

[2] *De Mon.* I. iv. 1–4. "Satis igitur declaratum est, quod proprium opus humani generis . . . est actuare semper totam potentiam intellectus possibilis."

[3] *Conv.* III. iii. 14–5. "Le *corpora composte* prima, siccome sono le miniere."
Par. VII. 124–5. ". . . Io veggio l' acqua, io veggio il foco,
L' aer, e la terra, e tutte lor misture."

[4] *Par.* VII. 133–5. "Ma gli elementi che tu hai nomati,
E quelle cose che di lor si fanno,
Da creata virtù sono informati."

[5] *Ristoro.* VI. 7. "A cagione della generazione è cessata e ammollata l' una acqua sopra la terra."

[6] Boehmer reads *Simplici naturae* instead of *Praeter simplicem naturam.*

[7] Arist. *Nic. Eth.* I. xiii. "ἄλλη τις φύσις τῆς ψυχῆς."

[8] *Par.* XXIII. 40–2. "Come foco di nube si disserra,
Per dilatarsi sì che non vi cape,
E fuor di sua natura in giù s' atterra.'

[9] Arist. *Nic. Eth.* I. xiii. "ὥσπερ τοῦ πατρὸς ἀκουστικόν τι."

forms were not always in act, the Mover of the Heavens [1] would fail in the completeness of the distribution of his goodness, which is not supposable.[2] And as all material forms of generated and corruptible things, save the forms of the elements, require matter, and their substance [3] is mixed and complex, to provide which, as their aim, elements, as elements, are ordained ; [4] and a mixture cannot take place where the things to be mixed cannot be at the same time, as is self-evident : — it follows necessarily that there is some place in the universe where all the things to be mixed, that is, the elements, can come together : and this could not be, unless the earth projected somewhere,[5] as is obvious to any one considering it. Therefore, inasmuch as all nature is obedient to the purpose of Universal Nature, it was necessary for earth, besides its simple nature, which is to fall downwards, to have another nature [7] whereby it should be obedient to the purpose of Universal Nature, — namely, that it should suffer itself to be partially drawn up [8] by the efficiency of heaven, as if obedient to its teacher ; [9] just as we see in respect to lust and proneness to anger in men, which accord-

[1] *Par.* I. i. "The glory of Him who moveth everything."
Par. II. 129. ". . . The blessed motors."
De Mon. I. ix. 12. "One mover, who is God."
Epist. X. 349–50. "*The glory of Him who moveth everything*, which is God."

[2] *De Mon.* I. iv. 1–4. "It has thus been sufficiently set forth that the proper work of the human race is to set in action the whole capacity of that understanding which is capable of development."

[3] *Conv.* III. iii. 14–5. "The primary composed bodies, such as minerals."
Par. VII. 124–5. ". . . I see the air, I see the fire,
The water, and the earth, and all their mixtures."

[4] *Par.* VII. 133–5. "But all the elements which thou hast named,
And all those things which out of them are made,
By a created virtue are informed."

[5] Ristoro d'Arezzo. *Comp. del Mundo.* VI. 7. "For the purpose of generation is the water upon the earth limited and gathered together."

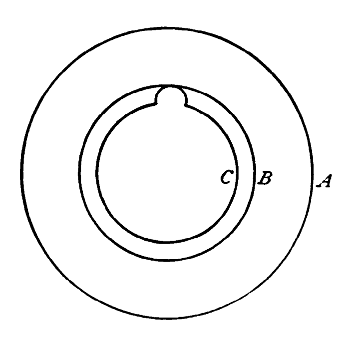
[7] Arist. *Eth.* I. xiii. 15. "Now another natural power of the soul.

[8] *Par.* XXIII. 40–2. "As fire from out a cloud unlocks itself,
Dilating so it finds not room therein,
And down, against its nature, falls to earth."

[9] Arist. *Eth.* I. xiii. 19. "As though listening to the suggestions of a parent."

quae licet secundum proprium impetum[1] ferantur secundum sensitivam affectionem, secundum tamen quod rationi obedibiles sunt, quandoque a proprio impetu retrahuntur,[2] ut patet ex primo *Ethicorum*.

§ XIX. Et ideo, licet terra secundum simplicem eius naturam aequaliter petat centrum, ut in ratione instantiae dicebatur; secundum tamen naturam quandam patitur elevari in parte, naturae universali obediens, ut mixtio sit possibilis; et secundum haec salvatur concentricitas terrae et aquae; et nihil sequitur impossibile apud recte philosophantes; ut patet in ista figura. Sit coelum circulus in quo A, aqua circulus in quo B, terra circulus in quo C; nec refert, quantum ad propositum verum, aqua parum vel multum a terra distare videatur. Et sciendum quod ista est vera, quia est qualis est forma et situs duorum elementorum: aliae duae superiores falsae; et positae sunt, non quia sic sit, sed ut sentiat discens, ut ille dicit in primo *Priorum*. Et quod terra emergat per gibbum et non per centralem circulum



[1] *Par.* I. 134-5. " . . . Se l' impeto primo
L' atterra."

[2] *De Vulg. Eloq.* II. ii. 47-54. " Sicut homo tripliciter spirituatus est, videlicet spiritu vegetabili, animali, et rationali, triplex iter perambulat; nam secundum quod vegetabile est, utile quaerit, in quo cum plantis communicat; secundum quod animale, delectabile, in quo cum brutis; secundum quod rationale, honestum quaerit, in quo solus est. . . ."

ing to their own impulse[1] are carried along by the promptings of sense, but yet inasmuch as they are capable of obedience to reason, sometimes are drawn back from their own impulse,[2] as we see in the first of the Ethics.[3]

§ XIX. And therefore,[4] although the earth according to its own simple nature may equally seek the center, as was shown in the reasoning of the objection: still according to another nature it admits of being drawn up in part, obeying Universal Nature, so that a mixture may be possible; and on this theory the concentricity of earth and water is preserved, and nothing impossible results from it, for those philosophizing correctly — as we see in this figure. Let heaven be the circle A, water the circle B, earth the circle C; nor does it matter, for the truth of the proposition, whether the water seems to be more or less distant from the earth. And knowing that this figure is the true one, because it agrees with the form and location of the two elements: the two preceding figures are false; and they are introduced, not because they are correct, but that the learner may understand, as he [Aristotle] says in the first of the Priors.[5] And when we consider the shape of the earth that emerges, we see that without any doubt the earth emerges with an excrescence and not

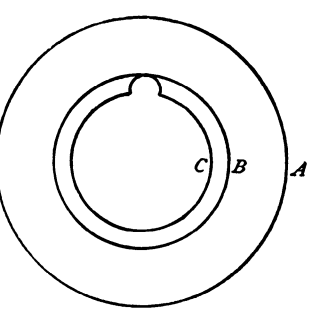


Fig. 5.

[1] *Par.* I. 134–5. " . . . If the first impetus
Earthward is wrested."

[2] *De Vulg. Eloq.* II. ii. 47–54. "As man has been endowed with a threefold life, namely, Vegetable, Animal, and Rational, he journeys along a threefold road: for in so far as he is Vegetable, he seeks what is useful in that which he has in common with plants; and in so far as he is Animal, he seeks for what is pleasurable in that which he has in common with the brutes; and in so far as he is Rational, he seeks for what is right."

[3] Arist. *Eth.* I. xiii. 15–7 (1102 *b.* 13 ff.) a chapter well known to Dante, but not elsewhere quoted in his Latin works (except § XX *infra*) under this name. Cf. § XI.

[4] *Conv.* III. v. Gives an outline of Dante's knowledge of Geography, agreeing throughout with the statements made in this section, though here, as Dr. Moore points out, there is not the direct copying which we should expect from a forger.

[5] Arist. *Anal. Pr.* I. xli. (49 *b.* 36 ff.) This work is perhaps quoted as *De Syllogismo* in *De Mon.* III. vii. 19.

circumferentiae, indubitabiliter patet, considerata figura terrae emergentis. Nam figura terrae emergentis est figura semilunii; qualis nullo modo esse posset, si emergeret secundum circumferentiam regularem sive centralem: nam, ut demonstratum est in theorematibus mathematicis, necesse est circumferentiam regularem sphaerae a superficie plana sive sphaerica, qualem oportet esse superficiem aquae, emergere semper cum horizonte circulari.[2] Et quod terra emergens habeat figuram qualis est semilunii,[3] patet et per naturales de ipsa tractantes, et per astrologos climata describentes, et per cosmographos regiones terrae per omnes plagas ponentes. Nam, ut comuniter ab omnibus habetur, haec habitabilis extenditur per lineam longitudinis a Gadibus,[5] quae supra terminos occidentales ab Hercule[6] ponitur, usque ad ostia fluminis Ganges, ut scribit Orosius.[7] Quae quidem longitudo tanta est, ut occidente Sole in aequinoctiali existente illis qui sunt in altero terminorum, oritur illis qui sunt in altero,[8] sicut per eclipsim[9] Lunae comper-

[2] Ristoro d'Arezzo. VI. 11. "L' acqua è cessata della terra circolarmente, come ella dee essere per ragione alla spera della terra."

[3] *Inf.* XXXIV. 122–4. ". . . La terra che pria di qua si sporse
Per paura di lui fe' del mar velo,
E venne all' emisperio nostro."

[5] *Par.* XXVII. 82–3. "Sì ch' io vedea di là da Gade il varco
Folle d' Ulisse."

[6] Brunetto Latini. I. 134. "En Espaigne est la fins de la terre, et meismement le tesmoizne la terre de Calpe et Albina, ou Hercules ficha les colonnes. . . ."

[7] *De Mon.* II. iii. 87–9. "In Africa dicit Orosius, in sua mundi descriptione, sic: 'Ultimus autem finis eius est mons Atlas.'"

[8] *Purg.* IV. 70–1. ". . . Ambo e due hanno un solo orizzon
E diversi emisperi."

[9] *De Mon.* III. iv. 141–2. "Ut in eius [Lunae] eclipsi manifestum est."

with the central circle [1] of its circumference. For the shape of the earth that emerges is the shape of a half-moon, which could in no wise be if it emerged in a regular, or central, circumference: for, as the theorems of mathematics show, the regular circumference of a sphere must necessarily emerge from a plane, or spherical surface — such as the surface of the sea — with a circular horizon.[2] And that the earth which emerges has a shape like a half-moon [3] is shown by students of nature treating thereof, both by astronomers describing the climates,[4] and by geographers laying out the regions of earth everywhere. For as is the universal opinion, this habitable region extends on a longitudinal line from Cadiz,[5] which was founded on the westernmost boundaries by Hercules,[6] even to the mouths of the river Ganges, as Orosius[7] writes. This longitude indeed is such, that when at the equinox the sun sets on those who are at one extremity, it rises on those who are at the other,[8] as astronomers have discovered from the lunar eclipses.[9] Therefore the extremities of the afore-mentioned

[1] The fifth marvellous Anticipation noted by Stoppani is that the dry land is merely humps, or excrescences, or gibbosities, on the surface of the globe. It is hard to see what the anticipation consists of.

[2] Ristoro d'Arezzo. VI. 11. "Water is limited by the earth circularly, as must needs be by reason of the globe of the earth."

[3] The grouping of continents to the North is the sixth Anticipation noted by Stoppani. This is an ancient rather than a modern conception, and the treatment here given, as well as the idea itself, thoroughly Dantesque.

Inf. XXXIV. 122–4. ". . . The land, that whilom here emerged,
For fear of him made of the sea a veil,
And came to our hemisphere."

[4] The early geographers divided the earth into seven zones, called climates, by circles parallel to the equator.

[5] *Par.* XXVII. 82–3. "So that I saw the mad track of Ulysses
Past Gades."

[6] Brunetto Latini. *Trésor.* I. 134. "In Spain is the end of the world, and thereto testifies the land of Calpe and Albina, where Hercules planted the columns."

[7] Orosius. *Adv. Pag.* I. ii. 7, 13. Orosius was doubtless Dante's chief authority on all geographical subjects. This same chapter is quoted in *De Mon.* II. iii. 87–9. "Orosius says that it is in Africa, in his description of the world, where he writes: 'Its boundary is Mount Atlas.'"

[8] *Purg.* IV. 70–1. ". . . They both one sole horizon have,
And hemispheres diverse."

[9] *De Mon.* III. iv. 141–2. "Which is manifest at the time of its eclipse."

tum est ab astrologis. Igitur oportet terminos praedictae longitudinis distare per CLXXX gradus, quae est dimidia distantia totius circumferentiae. Per lineam vero latitudinis, ut comuniter habemus ab eisdem, extenditur ab illis quorum zenith est circulus aequinoctialis, usque ad illos quorum zenith est circulus descriptus a polo zodiaci circa polum mundi, qui distat a polo mundi circiter XXIII gradus: et sic extensio latitudinis est quasi LXVII graduum, et non ultra, ut patet intuenti. Et sic patet, quod terram emergentem oportet habere figuram semilunii,[1] vel quasi;[2] quia illa figura resultat ex tanta latitudine et longitudine, ut patet. Si vero haberet horizontem circularem, haberet figuram circularem cum convexo: et sic longitudo et latitudo non differrent in distantia terminorum; sicut manifestum esse potest[3] etiam mulieribus.[4] Et sic patet de tertio proposito in ordine dicendorum.

§ XX. Restat nunc videre de causa finali et efficiente huius elevationis terrae, quae demonstrata est sufficienter: et hic est ordo artificialis; nam quaestio an est, debet praecedere quaestionem propter quid est. Et de causa finali sufficiant quae dicta sunt in praemeditata distinctione. Propter causam vero efficientem investigandam, praenotandum est, quod tractatus praesens non est extra materiam naturalem, quia inter ens mobile, scilicet aquam, et terram, quae sunt corpora naturalia; et propter haec quaerenda est certitudo secundum materiam naturalem, quae est hic materia subiecta: nam circa unumquodque

[1] Rist. d'Arezzo. *Comp. del Mundo.* VI. 11. "Ed avemo la terra scoperta, come è la figura della luna, quando noi la veggiamo mezza."
Albertus Magnus. III. i. "Haec habitatio quadrangula est inter quattuor arcus."

[2] *Par.* I. 44. "Tal foce quasi."

[3] *De Mon.* I. iv. 30–1. "Ut omnibus manifestum esse potest."
De Mon. I. xii. 38–9. "Iterum manifestum esse potest."

[4] *Conv.* IV. xix. 88–9. "Alle donne non è tanto richiesto."
De Vulg. Eloq. I. i. 6. "Etiam mulieres . . . nitantur."
Epist. X. 224–5. "Loquutio vulgaris, in qua et mulierculae communicant."

longitude must be 180 degrees distant, which is half the length of the total circumference. As to the latitudinal line, indeed, as we generally learn from the same [authorities], it extends from the people whose zenith is the equinoctial circle, to those whose zenith is the circle described by the zodiacal pole about the world's pole, which is some 23 degrees from the world's pole, and so the extent of the latitude is some 67 degrees and no more, as is plain to one who considers. And so it is clear that the earth which emerges must have the shape of a half-moon,[1] or nearly so;[2] because that shape results from such latitude and longitude, as is obvious. If in truth it had a circular horizon, it would have a convex circular shape; and so the longitude and latitude would not differ in the distance between their extremities, as can be made manifest[3] even to women.[4] And so the third proposition in the order of our discussion is made clear.

§ XX. It now remains to consider the final and efficient cause of this elevation of the earth, which has been sufficiently proved to exist; and this is the artificial order; for we should inquire whether a thing exists before we inquire why it exists.[5] Concerning the final cause, what has been said in the division already considered is sufficient. In order to investigate the efficient cause, we must first note that the present treatise is not concerned with things outside of natural matter, since it treats of movable entities, namely water and earth, which are natural bodies, and in regard to these we should seek certainty in accordance with natural matter, which in this case is the subject matter: for concerning any class of things we should seek certainty as far as the

[1] Ristoro d'Arezzo. VI. 11. "And we have the uncovered earth, shaped like the moon, when we see her half full."

Albertus Magnus. *De Nat. Loc.* III. i. "This habitable region is quadrangular and bounded by four arcs."

[2] *Par.* I. 43. "Almost that passage."

[3] *De Mon.* I. iv. 30–1. "As may appear manifest to all."

De Mon. I. xii. 38–9. "It is therefore again manifest."

[4] *Conv.* IV. xix. 88–9. "From . . . women we do not require so much."

De Vulg. Eloq. I. i. 6. "Even women . . . strive."

Epist. X. 224–5. "The vulgar tongue, in which even housewives hold converse."

[5] Arist. *Anal. Post.* II. vii. (93 *a.* 20).

genus in tantum certitudo quaerenda est, in quantum natura rei recipit; ut patet ex primo *Ethicorum*.[1] Quum igitur innata sit nobis via investigandae veritatis circa naturalia ex notioribus nobis naturae, vero minus notis, ad certiora naturae et notiora, ut patet ex primo *Physicorum*;[3] et notiores sint nobis in talibus effectus quam causae, quia per ipsos[4] inducimur in cognitionem causarum, ut patet: quia eclipsis solis[6] duxit in cognitionem interpositionis lunae;[7] unde propter admirari coepere philosophari; viam inquisitionis in naturalibus oportet esse ab effectibus[8]

[1] *Inf.* XI. 79–80. "Non ti rimembra di quelle parole,
Colle quai la tua Etica pertratta."
Inf. XI. 101. "E se tu ben la tua Fisica note."

Conv. IV. xiii. 74–7. "Nel primo dell' *Etica* dice 'che 'l disciplinato chiede di sapere certezza nelle cose, secondochè la loro natura di certezza riceva.'"

De Mon. II. ii. 63–6. "In primis ad Nichomachum: 'Non similiter in omni materia certitudo quaerenda est, sed secundum quod natura rei subiectae recipit.'"

[3] *Conv.* II. i. 107–12. "Dice il Filosofo nel primo della *Fisica*, la natura vuole che ordinatamente si proceda nella nostra conoscenza, cioè procedendo da quello che conoscemo meglio, in quello che conoscemo non così bene."
Epist. V. 122–3. "Si ex notioribus nobis innotiora; similiter. . . ."

[4] This word is missing in the edition of 1508. A marginal note in the copy belonging to Cornell University inserts: *eos.*

[6] *Par.* II. 79–80. ". . . Fora manifesto
Nell' eclissi del sol."

[7] *Conv.* II. iii. 57–8. "Nello eclissi del Sole appare sensibilmente la Luna essere sotto il Sole."

[8] Boehmer places a comma after *philosophari*, and a full stop after *causas.*

nature thereof allows; as we see from the first of the Ethics.[1] Since, therefore, the way is innate in us to investigate truths concerning natural phenomena, proceeding from the better known facts of nature, to those less known, (to the more certain and better known facts in nature[2]) as we see from the first of the Physics:[3] — and since in such matters effects are better known to us than causes, because by them we are led to a knowledge of the causes,[5] (as for instance a solar eclipse led men[6] to understand the transit of the moon,[7] so that from wondering men began to philosophize,) the path of research in natural philosophy

[1] Cf. this mention of the Ethics, and, *infra*, the Physics, with:

Inf. XI. 79–80: "Hast thou no recollection of those words
With which thine Ethics thoroughly discusses."

and *Inf.* XI. 101: "And if thy Physics carefully thou notest."

Arist. *Nic. Eth.* I. iii. 4 (1094 *b.* 23–5).

Conv. IV. xiii. 74–7. "In the first of the *Ethics* he says that 'the educated man demands certainty of knowledge about things, in so far as their nature admits of certainty.'"

De Mon. II. ii. 63–6. "In the first book of his Ethics, where he says: 'We must not seek for certitude in every matter, but only as far as the nature of the subject admits.'"

[2] The bracketed clause is perhaps better omitted altogether. The whole passage is probably corrupt.

[3] Arist. *Phys.* I. i. (184 *a.* 16 ff.).

Conv. II. i. 107–12. "The Philosopher says, in the first of the *Physics*, nature wills that our knowledge should increase in due order, that is, that we should proceed from what we know best, to what we do not know so well."

Epist. V. 122–3. "If from the things better known those less known are evident to us, in like manner . . ."

[5] Arist. *Met. H.* iv. (1044 *b.* 10–15), and elsewhere. But Aristotle generally draws his illustration from the Eclipse of the Moon, not as here, of the Sun.

[6] *Par.* II. 79–80. ". . . In the sun's eclipse
It would be manifest."

[7] Arist. *Met. A.* ii. (982 *b.* 12).

Conv. II. iii. 57–8. "In solar eclipses we can plainly see that the moon is below the sun."

ad causas;[1] quae quidem via, licet habeat certitudinem sufficientem, non tamen habet tantam, quantam habet via inquisitionis in mathematicis, quae est a causis, sive a superioribus, ad effectus, sive ad inferiora: et ideo quaerenda est illa certitudo, quae sic demonstrando haberi potest. Dico igitur quod causa huius elevationis efficiens non potest esse terra ipsa; quia quum elevari sit quoddam ferri sursum: et ferri sursum sit contra naturam terrae: et nihil, per se loquendo,[2] possit esse causa eius quod est contra suam naturam; relinquitur, quod terra huius elevationis efficiens causa esse non possit. Et similiter etiam neque aqua esse potest; quia quum aqua sit corpus homogeneum, in qualibet sui parte, per se loquendo, uniformiter oportet esse virtutem; et sic non esset ratio qua magis elevasset hic quam alibi. Haec eadem ratio removet ab hac causalitate aerem et ignem; et quum non restet ulterius nisi coelum, reducendus est hic effectus in ipsum, tanquam in causam propriam. Sed quum sint plures coeli, adhuc restat inquirere in quod, tanquam in causam propriam, habeat reduci.[4] Non in coelum lunae; quia quum organum suae virtutis sive influentiae sit ipsa luna: et ipsa tantum declinet per zodiacum ab aequinoctiali versus polum antarcticum quantum versus arcticum,[5] ita elevaret ultra aequinoctialem,

[1] *Par.* II. 94–6. "Da questa instanzia può diliberarti
Esperienza, se giammai la provi,
Ch' esser suol fonte ai rivi di vostr' arti."

[2] *De Mon.* II. vi. 25–6. "Unde impossibile est aliqua duo per se loquendo. . . ."

[4] *De Mon.* III. xii. 60 and 100–1. "Habent reduci."

[5] Alfraganus. *Elem. Astron.* XVIII. "Eccentrici Lunae planum . . . a zodiaci plano deflectit ad septentrionem et austrum declinatione rata et immutabili."

must be from effects to causes.[1] This path, indeed, although it has considerable certitude, has not as much as the path of inquiry in mathematics, which leads from causes, that is, from superior things, to their effects, that is, to the inferior: and therefore that certitude is to be sought, which may be had from demonstration of this sort.

I say then that the efficient cause of this elevation cannot be the earth itself: for to be elevated implies being drawn up: and to be drawn up is contrary to earth's nature: and nothing, considered by itself,[2] can be the cause of anything contrary to its nature — it follows that earth cannot be the efficient cause of this elevation. And for like reason water cannot be so; because water being a homogeneous body, its efficiency must be uniform in its every part, considered separately; and hence there would be no reason for it to be more elevated in one place than in another. The same reasoning shows that neither air nor fire can be the cause; and as nothing further remains save heaven,[3] this effect must be ascribed to the heaven, as its proper cause. But since there are many heavens, it remains to inquire to which, as the proper cause, it is to be ascribed.[4] Not to the heaven of the moon; for the organ of its power or influence is the moon itself; and as it declines in the zodiac as far from the equinox towards the antarctic pole as towards the arctic,[5] it would therefore raise up the earth on the

[1] *Par.* II. 94–6. "From this reply experiment will free thee
If e'er thou try it, which is wont to be
The fountain to the rivers of your arts."

[2] *De Mon.* II. vi. 25-6. "And therefore it is impossible that any two things, spoken of as separate things . . ."

[3] Aristotle. *De Mundo.* III. (392 *b.* 35–393 *a.* 4). αἰθήρ, the fifth element, is for Dante equivalent to the heaven. And Aristotle, also, frequently says that the two terms are interchangeable. Dr. Moore (I. 124, 300), besides the passage from Aristotle, quotes St. Augustine, Plato, Sacrabosco, and others, to show that this idea of a "quinta essentia" was familiar to the philosophers of Dante's day.

[4] *De Mon.* III. xii. 60 and 100. "They have to be brought."

[5] Alfraganus. (Moore. II. 339). "The plane of the moon's eccentricity inclines from the plane of the zodiac to the North and to the South by an immutable and computed declination."

sicut citra; quod non est factum. Nec valet dicere quod illa declinatio non potuit esse propter magis appropinquare terrae per excentricitatem; quia si haec virtus elevandi fuisset in luna (quum agentia propinquiora virtuosius operentur), magis elevasset ibi quam hic.[1]

§ XXI. Haec eadem ratio removet ab huiusmodi causalitate omnes orbes planetarum; et cum primum mobile, scilicet sphaera nona,[2] sit uniforme per totum,[3] et per consequens uniformiter per totum virtuatum, non est ratio quare magis ab ista parte quam ab alia elevasset. Cum igitur non sint plura corpora mobilia, praeter coelum stellatum, quod est octava sphaera,[4] necesse est hunc effectum ad ipsum[6] reduci. Ad cuius evidentiam sciendum, quod licet coelum stellatum habeat unitatem in substantia, habet tamen multiplicitatem in virtute;[7] propter quod oportuit habere diversitatem[8] illam in partibus quam videmus,[9] ut per

[1] The text is here corrupt beyond hope of correction.

[2] *Conv.* II. iv. 9–12. "Lo nono è quello . . . lo quale chiamano molti cielo Cristallino."

[3] *Par.* XXVII. 100–1. "Le parti sue vivissime ed eccelse
Sì uniformi son."

De Mon. I. ix. 11–2. "Coelum totum unico motu, scilicet primi mobilis.

[4] *Conv.* II. xiv. 59. "All' ottava spera, cioè alla stellata. . . ."

[6] Ristoro. I. 20. "Questa forza fue a cagione della congiurazione delle pianete e delli animali c' abitano sopra la terra."

[7] *Par.* II. 136–8. "Così l' intelligenza sua bontate
Multiplicata per le stelle spiega,
Girando sè sopra sua unitate."

[8] *Par.* II. 70. "Virtù diverse esser convengon frutti."
Par. II. 139. "Virtù diversa fa diversa lega."

[9] *Par.* II. 64–6. "La spera ottava vi dimostra molti
Lumi, li quali nel quale e nel quanto
Notar si posson di diversi volti."

further side of the equinox as well as on this side, which is not the case. Nor does it avail to say that this declination cannot be, because of its closer approach to the earth through its excentricity, for if this elevating efficiency existed in the moon (since active forces are more potent as they are nearer) it would raise the earth more in one place than in another.

§ XXI. The same reasoning rejects as the cause all the orbs of the planets; and as the *primum mobile*, or ninth sphere,[2] is throughout uniform,[3] and consequently throughout of uniform efficiency, there is no reason why it should elevate more in one place than in another. As therefore there are no further movable bodies, except the heaven of the fixed stars, or eighth sphere,[4] we must ascribe this effect[5] to that heaven.[6] As evidence of this, it is to be known that, while the starry heaven has uniformity in substance, it has nevertheless variety in efficiency;[7] and it must have that diversity[8] in the parts which we see,[9]

[2] *Conv.* II. iv. 9–12. "The ninth is that . . . which is called by many the Crystalline."

[3] *Par.* XXVII. 100–1. "Its parts exceeding full of life and lofty
Are all so uniform."

De Mon. I. ix. 11–2. "The whole heaven is regulated with one motion, to wit, that of the *primum mobile*."

[4] *Conv.* II. xiv. 59. "To the eighth sphere, that is, to the Starry Heaven."

[5] i. e., the elevation of the earth.

[6] Ristoro d' Arezzo explains all natural phenomena by the influence of the stars; *Comp. del Mundo.* I. 20. "This force results from the combination of the planets and the animals of the Zodiac."

[7] According to Professor Schmidt — *Über Dante's Stellung, etc.* p. 17. — the Moon was supposed to exert its influence on Water; the Stars on Earth; the Sun on Fire; the planets on Air. This, however, may be seriously questioned.

Par. II. 136–8. "So likewise this Intelligence diffuses
Its virtue multiplied among the stars,
Itself revolving on its unity."

[8] *Par.* II. 70. "Virtues diverse must be perforce the fruits."

Par. II. 139–40. "Virtue diverse doth a diverse alloyage
Make . . ."

[9] *Par.* II. 64–6. "Lights many the eighth sphere displays to you
Which in their quality and quantity
May noted be of aspects different."

organa diversa[1] virtutes diversas influeret: et qui haec non advertit, extra limitem philosophiae se esse cognoscat.[2] Videmus in eo differentiam in magnitudine stellarum et in luce, in figuris et imaginibus constellationum; quae quidem differentiae frustra esse non possunt, ut manifestissimum esse debet omnibus in philosophia nutritis.[3] Unde alia est virtus huius stellae et illius, et alia huius constellationis et illius; et alia virtus stellarum quae sunt citra aequinoctialem, et alia earum quae sunt ultra.[4] Unde cum vultus inferiores sint similes vultibus superioribus, ut Ptolemaeus dicit; consequens est,[6] quod iste effectus non possit reduci nisi in coelum stellatum, ut visum est; eo quod similitudo virtualis agentis consistat in illa regione coeli quae operit hanc terram detectam. Et cum ista terra detecta extendatur a linea aequinoctiali usque ad lineam quam describit polus zodiaci circa polum mundi, ut superius dictum est; manifestum est, quod virtus elevans est illis stellis quae sunt in regione coeli istis duobus circulis[7] contenta, sive elevet per modum attractionis, ut magnes attrahit ferrum, sive per

[1] *Par.* II. 121. "Questi organi del mondo così vanno."

[2] *Conv.* II. xiv. 26–30. "Della quale induzione, quanto alla prima perfezione, cioè della generazione sustanziale, tutti li filosofi concordano che i cieli sono cagione."

[3] *Epist.* IX. 32–3. "Philosophiæ domestico."

[4] Ristoro. I. 2. "E vedemo la parte di settentrione, la quale è inverso lo polo arctico, spessa e vestita di stelle, e la parte del mezzodì, la quale è inverso lo polo antarctico, a quello rispetto rada e ignuda di stelle."

[6] This is the reading of Torri, followed by Dr. Moore. Angelitti — p. 6. — keeps closer to the text of the first edition, and reads: "Consequens est (cum iste effectus non possit reduci nisi in coelum stellatum, ut visum est) quod similitudo . . . "

[7] *Conv.* II. iv. 75–7. "Le stelle . . . sono più piene di virtù tra loro, quanto più sono presso a questo cerchio."

Ristoro. I. 20. "E troviamla scoperta inverso la parte di settentrione, sotto quella parte del cielo la quale è piue stellata."

that it may through its diverse organs [1] exert its divers efficiencies: and whoso does not perceive this must know himself to be outside the boundaries of philosophy.[2] We see in it differences in the sizes of stars, and in their light, in the shapes and images of the constellations; which differences cannot be purposeless, as must be entirely evident to all who are nurtured in philosophy.[3] So that this star and that, this constellation and that, have different degrees of efficiency; and different efficiency have the stars on this side of the equinox, and those on the other.[4] And as aspects below resemble aspects above, as Ptolemy [5] says, it follows that this effect cannot be ascribed save to the starry heaven, as we have seen; and therefore that the virtual correspondence of the agent is located in that part of the heaven which overhangs this uncovered earth. And as this uncovered earth stretches from the equinoctial line even to the line that the zodiacal pole describes about the world's pole, as has been said above, it is evident that the uplifting efficiency [6] lies in those stars which are in the region of heaven contained between these two circles,[7] whether it elevates by attraction, as magnets

[1] *Par.* II. 121. "Thus do these organs of the world proceed."

[2] *Conv.* II. xiv. 26–30. "Of which influence, in so far as it concerns the primal perfection, that is, material generation, all philosophers are agreed that the heavens are the cause."

[3] *Epist.* IX. 32–3. "A man familiar with philosophy."

[4] Ristoro d'Arezzo. *Comp. del Mundo.* I. 2. "We see the northern portion, towards the arctic pole, thickly covered with stars, and the southern portion, towards the antarctic pole, comparatively deprived and bare of stars."

[5] Ptolemy is here quoted vaguely, as Dante does twice in *Conv.* II. xiv. Mr. Toynbee says that Dante's knowledge of Ptolemy was doubtless derived at second hand from Alfraganus, whose *Elementa Astronomica* is to a great extent based on the *Almagest*, or *Great Composition of Astronomy* of Ptolemy.

[6] Universal attraction of the great bodies in space, including the earth, is the seventh Anticipation found by Stoppani. The only foundation for this statement is the present passage, which, as Dr. Moore says, is hard to distort into the modern doctrine.

[7] *Conv.* II. iv. 75–7. "The stars . . . have more virtue among themselves as they are nearer to this circle."

Ristoro d'Arezzo. *Comp. del Mundo.* I. 20. "And we find it uncovered towards the north, beneath that part of the sky which is the most starry."

modum pulsionis, generando vapores pellentes,[1] ut in particularibus montuositatibus.[2] Sed nunc quaeritur: Quum illa regio coeli circulariter feratur, quare illa elevatio non fuit circularis? Respondeo quod ideo non fuit circularis, quia materia non sufficiebat ad tantam elevationem. Sed tunc arguitur magis, et quaeritur: Quare potius elevatio hemisphaerialis fuit ab ista parte quam ab alia? Ad hoc est dicendum, sicut dicit Philosophus in secundo *de Coelo*, quum quaerit quare coelum movetur ab oriente in occidentem et non e converso: ibi enim dicit, quod consimiles quaestiones vel a multa stultitia vel a multa praesumptione procedunt, propterea quod sunt supra intellectum nostrum.[4] Et ideo dicendum ad hanc quaestionem, quod ille dispensator[5] Deus gloriosus, qui dispensavit de situ polorum,[6] de situ centri mundi, de distantia ultimae circumferentiae universi a centro eius, et de aliis consimilibus, haec fecit tanquam melius sicut et illa. Unde quum

[1] *Purg.* XXI. 56. " . . . Vento che in terra si nasconda."

Dr. Prompt. *Les Œuvres Apocryphes du Dante*, p. 40. "Torri n'hesite pas à dire que ces sottises scolastiques sont des traits de gènie."

[2] *Catholicon. Guttenburg Ed. 1460.* "Montuus, a mons; et hinc montuosus in eodem sensu, id est plenus montibus; unde hec Montuositas, -tatis."

[4] *Purg.* XXIV. 61. "E qual più a guardar oltre si mette."

Conv. II. vi. 150–1. "Iddio lo sa; chè a me pare presuntuoso a giudicare."

Conv. III. xv. 105–7. "Conoscere di Dio, e dire di certe cose, . . . non sia possibile alla nostra natura."

[5] *Conv.* I. iii. 15–6. "Al Dispensatore dell' universo."

[6] All the later editors, including Dr. Moore, read: *populorum;* but as Angelitti asks (p. 6), how are the nations concerned here?

attract iron, or by a manner of impulse, generating impelling vapors,[1] as in some mountainous region.[2]

But now it is asked: Since this region of the heaven has a circular motion, why is not the elevation circular? I answer that it is not circular, because the material did not suffice for so great an elevation. But men will argue further and ask: Why is this hemispherical elevation on this side and not on the other? To this one can answer, as the Philosopher in the second of Heaven and Earth[3] when he asks why heaven moves from east to west and not conversely: for he says there, that such questions proceed from great folly or great presumption, since they are above our understanding.[4] And the same may be said to this question, that God the glorious Ordainer,[5] who ordained the location of the poles,[6] and the location of the world's center, the distance between the extreme circumference of the universe and the center thereof, and all like things, made each and all these even for the best. So when he said, "Let the waters be gathered together unto one place, and let the

[1] *Purg.* XXI. 56. " . . . The wind that in the earth is hidden."

Arist. *Meteor.* II. viii. (366 *b.* 15–367 *a.* 4).

Elasticity of vapor as a motive power is the eighth of Stoppani's Anticipations. It is not easy to recognize this idea in the present statement.

The elevation of the continents towards the northern hemisphere, is the ninth of Stoppani's Anticipations; but this is as ridiculous as the others. Even Dr. Prompt, who pooh-poohs the genuineness of the treatise, exclaims: "Torri does not hesitate to call these scholastic follies, marks of genius!"

[2] The curious word *montuositas* is only known to occur twice in the thirteenth century: in Nicolaus de Jamsilla, *de Gestis Frederici Secundi*, tom. 8., col. 55. (1258); and in Balbus Johannes de Janua, *Catholicon* (1286). In the latter work is this definition: "Montuus, from Mons; and hence Montuosus in the same sense, namely, full of mountains; whence Montuositas." (Moore. II. 325.)

[3] Arist. *De Coelo.* II. v. (287 *b.* 26–31), a book very familiar to Dante.

[4] *Purg.* XXIV. 61. "And he who sets himself to go beyond."

Conv. II. vi. 150–1. "God knows, for to me it seems presumptuous to judge."

Conv. III. xv. 105–7. "To know God and certain other things . . . is not possible to our nature."

[5] *Conv.* I. iii. 15–6. "The Dispenser of the universe."

dixit: 'Congregentur aquae in locum unum, et appareat arida,'[1] simul et virtuatum est coelum ad agendum, et terra potentiata ad patiendum.

§ XXII. Desinant ergo,[2] desinant homines quaerere quae supra eos sunt, et quaerant usque quo possunt, ut trahant se ad immortalia et divina pro posse,[3] ac maiora se relinquant. Audiant amicum Iob, dicentem: 'Numquid vestigia Dei comprehendes, et Omnipotentem usque ad perfectionem reperies?'[5] Audiant Psalmistam dicentem: 'Mirabilis facta est scientia tua; et me confortata est, et non potero ad eam.' Audiant Isaiam dicentem: 'Quam distant coeli a terra, tantum distant viae meae a viis vestris.'[7] Loquebatur equidem in persona

[1] Ristoro. VI. 2. "Se la virtù del cielo, che dee tenere l' acqua cessata che non spanda, per mantenere la terra scoperta, si cessasse e andasse via, l' acqua cessata converrebbe in suo luogo, e coprirebbe tutta la terra."

[2] *Purg.* III. 34–5. "Matto è chi spera che nostra ragione
Possa trascorrer la infinita via."

Conv. IV. v. 7–10. "Ma da maravigliare è forte, quando la esecuzione dello eterno consiglio tanto manifesto procede che la nostra ragione lo discerne."

[3] *Conv.* IV. xiii. 71–2. "L' uomo si dee trarre alle cose divine quanto può."

Aristotle. *Eth.* X. vii. 8. *οὐ χρὴ δὲ κατὰ τοὺς παραινοῦντας ἀνθρώπινα φρονεῖν ἄνθρωπον ὄντα οὐδὲ θνητὰ τὸν θνητόν, ἀλλ' ἐφ' ὅσον ἐνδέχεται ἀθανατίζειν.*"

S. Thomas Aquinas. *Summa.* I. v. "Homo debet se ad immortalia et divina trahere quantum potest."

[5] *Conv.* III. v. 202–5. "O ineffabile Sapienza che così ordinasti, quanto è povera la nostra mente a te comprendere."

[7] *Purg.* XXXIII. 88–90. "E veggi vostra via dalla divina
Distar cotanto, quanto si discorda
Da terra il ciel che più alto festina."

dry land appear,"[1] forthwith the heaven received virtue to act and the earth power to be acted upon.

§ XXII. Desist then,[2] let men desist from seeking into things that are above them, and let them seek only so far as their faculties allow, that they may draw near to things immortal and divine so far as they have power to do so,[3] and things beyond their power let them leave. Let them hear Job's friend[4] saying: "Canst thou understand the ways of God? canst thou find out the Almighty unto perfection?"[5] Let them hear the Psalmist saying: "Marvellous is thy knowledge; it has comforted me, and I cannot attain unto it."[6] Let them hear Isaiah saying: "As the heavens are higher than the earth, so are my ways higher than your ways";[7] and he was speaking even in the person of

[1] *Genesis*, I. 9.

Ristoro d'Arezzo. *Comp. del Mundo.* VI. 2. "Were the virtue of heaven that restrains the water from scattering, to keep the earth uncovered, to cease and depart, the withholden water would gather to its place, and cover the whole earth."

[2] *Purg.* III. 34–5. "Insane is he who hopeth that our reason
Can traverse the illimitable way."

Conv. IV. v. 7–10. "But we have reason to wonder greatly, when the execution of the Eternal Counsel proceeds in so manifest a way that our reason can discern it."

[3] *Conv.* IV. xiii. 71–2. "Man should draw near to divine things as far as he can."

Arist. *Nic. Eth.* X. vii. 8 (1177 *b.* 31 ff). "A man ought not to entertain human thoughts, because he is human, nor mortal thoughts, because he is mortal: but as far as is possible he should make himself immortal."

Quoted by Aquinas: *Summa contra Gentiles*, I. v. "Man should draw near to things immortal and divine as far as he can." This chapter was familiar to Dante (*Conv.* IV. xv. 25; IV. xxx. 29), while the word *immortal* would hardly have been added by a forger copying from *Conv.* IV. xiii. 71–2.

[4] Zophar the Naamathite.

[5] *Job*, xi. 7. The Vulgate differs slightly from the English Version. The Book of Job is nowhere else directly quoted by Dante.

Conv. III. v. 202–5. "O ineffable Wisdom, that has ordered thus! how poorly our minds can comprehend Thee!"

[6] *Ps.* cxxxviii. 6. (*Vulg. Ps.* cxxxix. 6). Verses 7–9 of this Psalm are quoted in *Epist.* X. 416–9.

[7] Isaiah, lv. 9.

Purg. XXXIII. 88–90. "And mayst behold your path from the divine
Distant as far as separated is
From earth the heaven that highest hastens on."

Dei ad hominem. Audiant voci Apostoli ad Romanos: 'O altitudo divitiarum scientiae et sapientiae Dei! quam incomprehensibilia iudicia eius, et investigabiles viae eius!'[2] Et denique audiant propriam Creatoris vocem dicentis:[3] 'Quo ego vado, vos non potestis venire.' Et haec sufficiant ad inquisitionem intentae veritatis.

§ XXIII. His visis, facile est solvere argumenta quae superius contra fiebant; quod quidem quarto[5] proponebatur faciendum. Cum igitur dicebatur: Duarum circumferentiarum inaequaliter a se distantium impossibile est idem esse centrum; dico quod verum est, si circumferentiae sunt regulares sine gibbo vel gibbis. Et cum dicitur in minori quod circumferentia aquae et circumferentia terrae sunt huiusmodi, dico quod non est verum,[6] nisi per gibbum qui est in terra: et ideo ratio non procedit. Ad secundum, cum dicebatur: Nobiliori corpori debetur nobilior locus, dico quod verum est secundum propriam naturam: et concedo minorem:[7] sed cum concluditur quod ideo aqua debet esse in altiori loco, dico quod verum est secundum propriam

[2] *Conv.* IV. xxi. 56–8. "O altezza delle divizie della sapienza di Dio, come sono incomprensibili i tuoi giudicii, e investigabili le tue vie."

De Mon. II. ix. 75–6. "O altitudo divitiarum sapientiae et scientiae Dei."

[3] *Epist.* X. 36–7. "Spiritum Sanctum audiat."

[5] This is generally changed to read *quinto*, and translated *in the fifth place*, inasmuch as refutation of arguments was the fifth point that the author promised, in § IX, to take up. However, as Professor Norton pointed out to me, the reading may be correct and refer to the ninth section itself, which, if §§ III–VIII are grouped as they should be under one head, becomes § IV.

[6] *De Mon.* III. xi. 14–5. "Dico quod nihil dicunt."

[7] *De Mon.* III. viii. 23. "Minorem concedo."

God to man. Let them hear the voice of the Apostle[1] to the Romans: "O the depths of the riches both of the wisdom and knowledge of God! how unsearchable are His judgments, and His ways past finding out!"[2] And finally let them hear the very voice of the Creator saying:[3] "Whither I go, ye cannot come."[4]

And let these words suffice for the inquiry after the truth we have sought.

§ XXIII. Now that we have seen these things, it is easy to refute the arguments above urged, which indeed we proposed doing in the fourth section. So when it was asserted that it is impossible for two circumferences not equidistant from one another to have the same center, I say that this is true, if the circumferences are regular, without one excrescence or more. But when it was asserted in the minor premise that the circumference of the water and the circumference of the earth are of this kind, I say that this is not true,[6] because of the excrescence which exists on the earth, and therefore the argument does not hold good. And secondly, when it was asserted that the nobler body deserves the nobler place, I say that this is true, according to its own nature; and I grant the minor premise;[7] but when it was concluded that therefore water must occupy the higher place, I say that this is true according to the proper nature of the two bodies: but because of

[1] St. Paul so called nine times elsewhere by Dante, including once in the Epistles.

[2] *Romans*, xi. 33.

Conv. IV. xxi. 56–8. "O the depth of the riches both of the wisdom and knowledge of God! how unsearchable are His judgments, and His ways past finding out!"

De Mon. II. ix. 75–6. "Oh the depth of the riches both of the wisdom and knowledge of God!"

[3] *Epist.* X. 36. "Let him hearken to the Holy Ghost."

[4] John, viii. 21.

[6] *De Mon.* III. xi. 14–5. "I reply that what they say is nought."

[7] *De Mon.* III. viii. 23. "Now I admit the minor premise."

naturam utriusque corporis; sed per supereminentem causam (ut superius dictum est) accidit in hac parte terram esse superiorem; et sic ratio deficiebat in prima propositione. Ad tertium, cum dicitur: Omnis opinio quae contradicit sensui est mala opinio, dico quod ista ratio procedit ex falsa imaginatione. Imaginantur enim nautae, quod ideo non videant terram in pelago existentes de navi, quia mare sit altius quam ipsa terra: sed hoc non est; immo esset contrarium, magis enim viderent. Sed est hoc quia frangitur radius rectus rei visibilis inter rem et oculum, a convexo aquae: nam cum aquam formam rotundam habere oporteat ubique circa centrum, necesse est in aliqua distantia ipsam efficere obstantiam alicuius convexi.[2] Ad quartum, cum arguebatur: Si terra non esset inferior etc.; dico quod illa ratio fundatur in falso; et ideo nihil est. Credunt enim vulgares et physicorum argumentorum ignari, quod aqua ascendat ad cacumina montium, et etiam ad locum fontium in forma aquae;[3] sed istud est valde puerile, nam aquae generantur ibi (ut per Philosophum patet in *Meteoribus* suis), ascendente materia in forma vaporis.[4] Ad quintum, cum dicitur quod aqua est corpus imitabile orbis lunae, et per hoc concluditur quod debeat esse excentrica, cum orbis lunae sit excentricus; dico quod ista ratio non habet necessitatem: quia licet unum adimitetur aliud in uno, non

[2] Roger Bacon. *Opus Majus*. IV. 10. "Relinquitur quod aliquid impedit visum illius qui est in navi. Sed nihil potest esse nisi tumor sphaericus aquae. Ergo est sphaericae figurae."

[3] Ristoro. VI. 7. "Secondo questa via potemo per ragione dire che l' acqua che corre giù per lo fiume sia già corsa molte volte, e l' acqua che piuove sia già piovuta molte volte."

[4] *Purg.* V. 109–11. "Ben sai come nell' aere si raccoglie
Quell' umido vapor che in acqua riede,
Tosto che sale dove il freddo il coglie."

the cause of supereminence (explained above) it happens that earth is higher in this part; and so the argument failed in the first proposition. And thirdly when it is asserted that every hypothesis which contradicts the senses is a wrong hypothesis, I say that this argument proceeds from a false supposition. For sailors suppose that on the sea on board ship they do not see the earth, because the sea is higher than the land itself; but this is not so, rather it would be contrary for they could see more.[1] But it is because the direct line of vision between the object and the eye is broken by the convexity of the water, for as water must be everywhere of spherical shape about its center, so in an appreciable distance it must make an obstacle of considerable convexity.[2] Fourthly, when it was argued that if the earth were not lower, etc., — I say that this reasoning is based on error and therefore null. For the vulgar herd and those ignorant of physical arguments think that water ascends to the summits of mountains and even to places where fountains are, in the form of water;[3] but this is surely puerile, for the waters are generated there — as the Philosopher shows in his Meteorics — the material ascending in the form of vapors.[4] And fifthly, when it is asserted that water is a body imitating the moon's orbit, and hence the conclusion is drawn that it must be excentric because the moon's orbit is excentric, I say that this reason is not necessarily sound; for while a thing may imitate an-

[1] Sacrabosco — says Dr. Moore, II. 323 — explains the shape of the earth, proving its sphericity by a diagram, "which explains why, unless the surface of the water were spherical, the view from the deck would be better, because the line of sight would be shorter."

[2] Roger Bacon. *Op. Maj.* Part IV. ch. 10. "It follows that something hinders the sight of one at sea. But this can be nothing other than the spherical swelling of the water; hence its shape is spherical."

[3] Ristoro d'Arezzo. *Comp. del Mundo.* VI. 7. "Thus we can say with reason that the water flowing in the stream has often flowed before, and water that rains down has often rained before."

[4] Arist. *Meteor.* I. ix. (346 *b.* 26–31) and II. iv. (360 *b.* 30–35). Both of these Books were familiar to Dante.

Purg. V. 109–11. "Well knowest thou how in the air is gathered
That humid vapor which to water turns,
Soon as it rises where the cold doth grasp it."

propter hoc est necesse quod imitetur in omnibus. Videmus ignem imitari circulationem coeli, et tamen non imitatur ipsum in non moveri recte, nec in non habere contrarium suae qualitati:[1] et ideo ratio non procedit. Et sic ad argumenta.

Sic igitur determinatur determinatio et tractatus de forma et situ duorum elementorum, ut superius propositum fuit.

§ XXIV. Determinata est haec philosophia dominante invicto Domino, domino Kane Grandi de Scala[2] pro Imperio sacrosancto Romano,[4] per me Dantem Aligherium, philosophorum minimum, in inclyta urbe Verona, in sacello Helenae gloriosae, coram universo clero Veronensi, praeter quosdam qui, nimia caritate ardentes,[5] aliorum rogamina non admittunt, et per humilitatis virtutem Spiritus Sancti pauperes,[6] ne aliorum excellentiam probare videantur, sermonibus eorum interesse refugiunt. — Et hoc factum est in anno a nativitate Domini nostri Iesu Christi millesimo trecentesimo vigesimo, in die Solis, quem praefatus

[1] *Conv.* IV. xxiii. 11–35. "Secondo li quattro combinatori delle contrarie qualitadi che sono nella nostra composizione."

Brunetto Latini. *Tesoro.* II. 31. "Come tutte le cose furo fatte del mischiamento delle complessioni."

[2] *Epist.* X. "Magnifico atque victorioso domino, domino Kani Grandi de Scala."

[4] *Epist.* VI. 4. "Sacrosancto Romanorum imperio."

Epist. VIII. 21. "Sacrosanctum ovile."

[5] *De Mon.* III. iii. 67. "Caritate arserunt."

[6] *Par.* XII. 93. ". . . *Pauperum Dei.*"

De Mon. II. xii. 4–5, and cf. III. x. 130. "Pauperes Christi."

other in one point, it does not therefore necessarily imitate it in all. We see fire imitating the circling of heaven, and yet it does not imitate its not moving straight, nor its not having contrary quality :[1] and so the reasoning does not hold good. So much for the arguments.

Thus is completed the discussion and exposition of the form and location of the two elements, as was above proposed.

§ XXIV. This philosophical inquiry was held, beneath the rule of the unconquered lord, the Lord Can Grande della Scala,[2] Vicar[3] of the Holy Roman Empire,[4] by me, Dante Alighieri, least among philosophers, in the famous town of Verona, in the Chapel of the glorious Helen, before the entire Veronese clergy, save a few, who, burning[5] with excess of love do not admit the inquiries of others, and, by virtue of their humility, poor[6] in the Holy Spirit, lest they should appear to testify to the worth of others, avoid attending their discourses. And this was done in the year 1320[7] after the birth of our Lord Jesus Christ, on Sun-

[1] Arist. *De Gen. et Cor.* II. ii. and iii. (330 *a.* 26–*b.* 7).

Conv. IV. xxiii. 113–5. "According to the four combinations of contrary qualities that exist in our composition."

Latini. *Tesoro.* II. 31. "All things (save the stars. Ch. 32) were made from the combination of the qualities."

[2] *Epist.* X. "To the magnificent and victorious lord, the Lord Can Grande della Scala."

[3] Can Grande was appointed Imperial Vicar in Verona by the Emperor Henry VII., in 1311.

[4] *Epist.* VI. 4. "The Holy Empire of the Romans."

Epist. VIII. 21. "The sacred fold."

[5] *De Mon.* III. iii. 67. "Burning with love."

[6] *Par.* XII. 93. " . . . Poor in God."

De Mon. II. xii. 4–5 and III. x. 130. "Poor of Christ."

[7] Boccaccio tells us that Dante spent the years 1313–1321 in Ravenna, which he left only twice, in 1316 or 1317, to go to Verona, and early in 1321, to Venice. If Moncetti forged the *Quaestio*, and was the Dante scholar such a forgery would prove him to be, is it likely that he would deliberately have invented this visit to Verona in 1320, apparently for no purpose? The vague answer given by Luzio and Renier (p. 26) is that to interpret such facts, we require to understand Moncetti's purposes and be better acquainted with his life than we are!

noster Salvator per gloriosam suam nativitatem, ac per admirabilem suam resurrectionem nobis innuit venerandum; qui quidem dies fuit septimus a Ianuariis idibus, et decimus tertius ante Kalendas[8] Februarias.

[8] Prompt. *Œuvres apocryphes du Dante*, p. 41. "De quelque manière qu'on puisse compter les jours avant les calendes, c'est-à-dire le 1er février, il est impossible d'en trouver treize, si l'on part du 20 janvier."

day, which our predestined Saviour bade us keep holy because of his glorious nativity[1] and his marvellous resurrection; which day[2] was the seventh after the ides of January and the thirteenth before the calends[3] of February.

[1] No other writer is known to have fixed the birth of Jesus Christ on a Sunday. Dr. Prompt by a long calculation makes it fall on the same day of the week as Jan. 19, 1320.

[2] Jan. 20, 1320, was, indeed, a Sunday.

[3] Dr. Prompt, who finds the forger of the *Quaestio* to be a man devoid of any mathematical knowledge, says: "Howsoever one count the days before the calends, that is, before the first, of February, it is impossible to find thirteen, starting Jan. 20." Does not Dr. Prompt know that the Romans counted back from the Calends including the Calends, so that Jan. 31 was Prid. Kal. Feb., or a. d. II. Kal. Feb.?